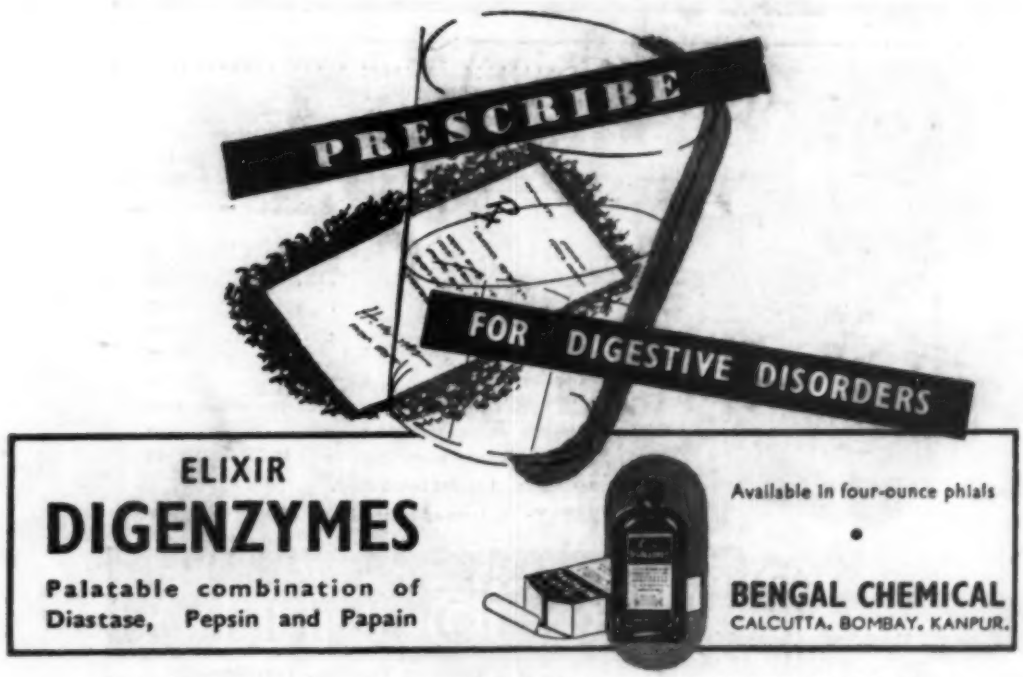
JOURNAL

of the

INDIAN MEDICAL ASSOCIATION

VOLUME 35 NUMBER 6 CALCUTTA SEPTEMBER 16, 1960

Published twice a month. Annual Subscription: Inland Rs. 24/-; Foreign Rs. 30/-; Single copy: Inland Re. 1/-; Foreign Rs. 1.25



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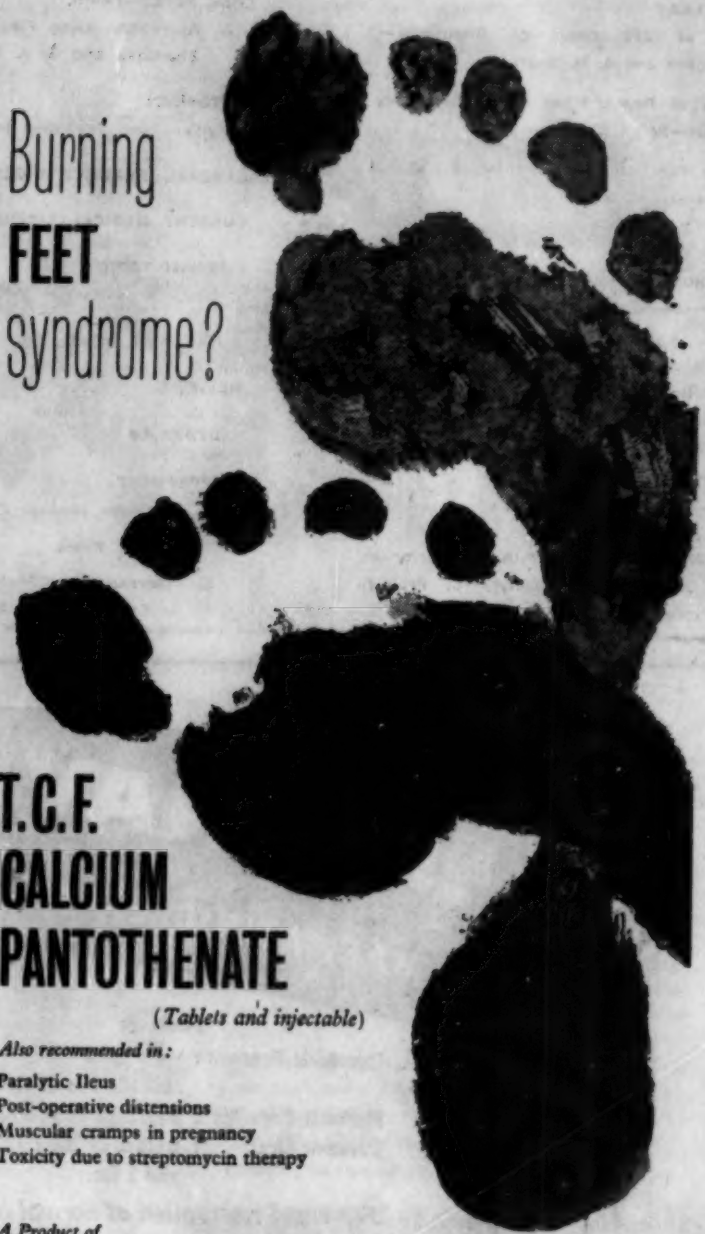

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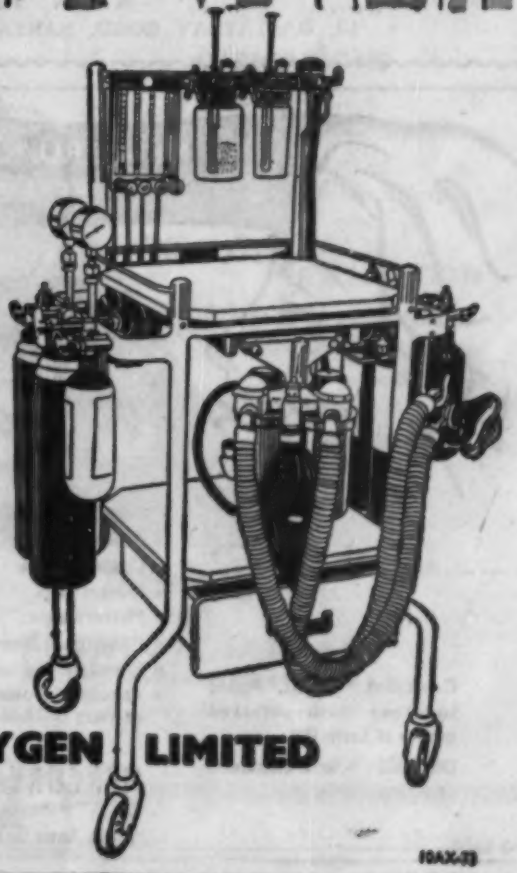

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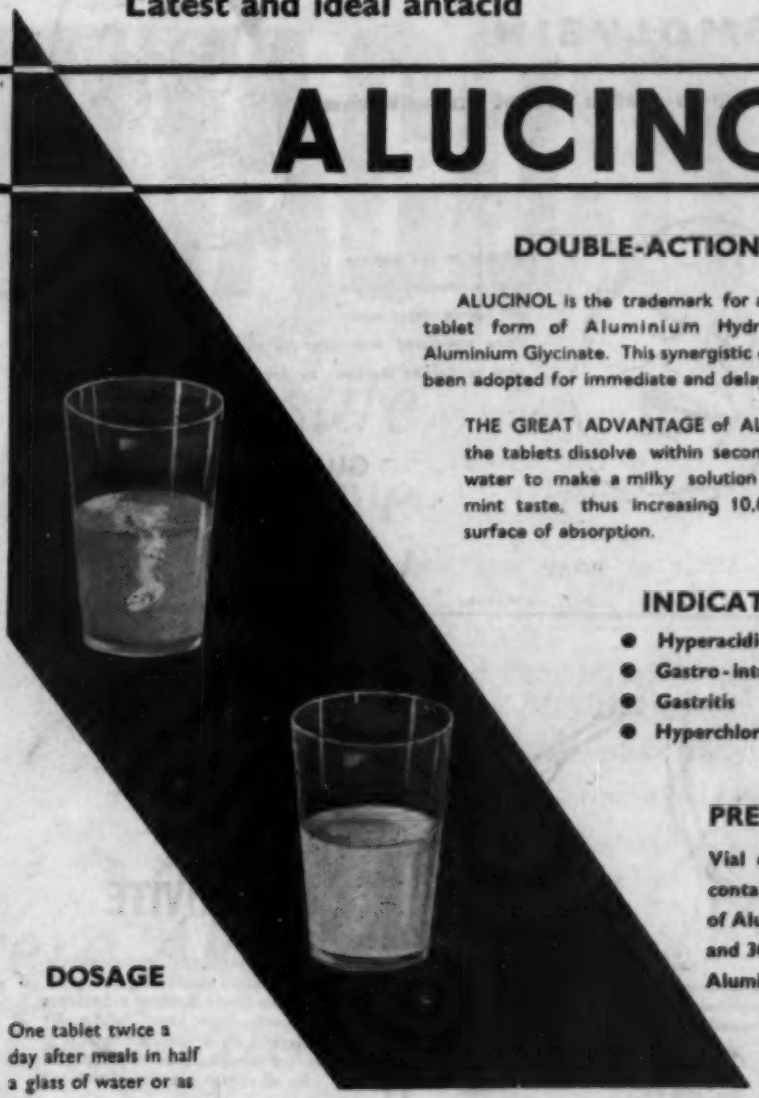

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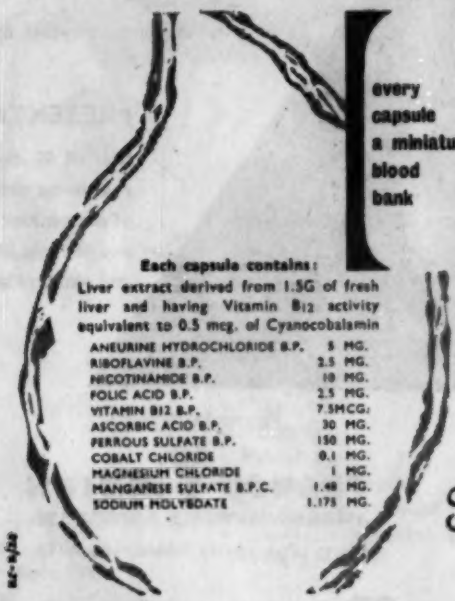

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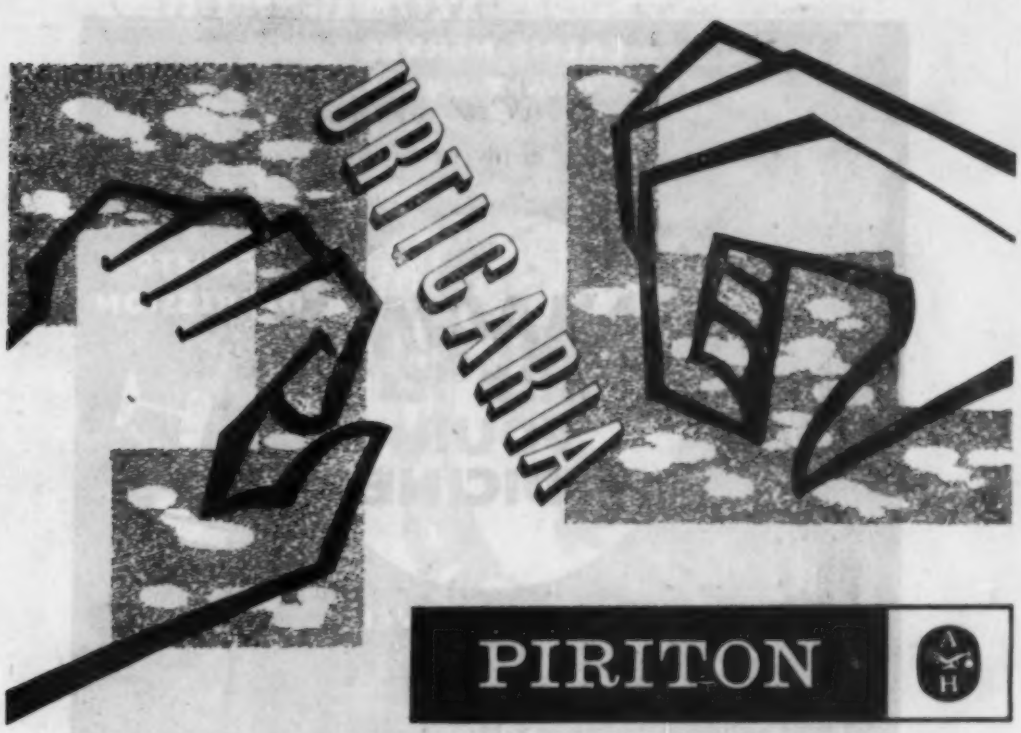

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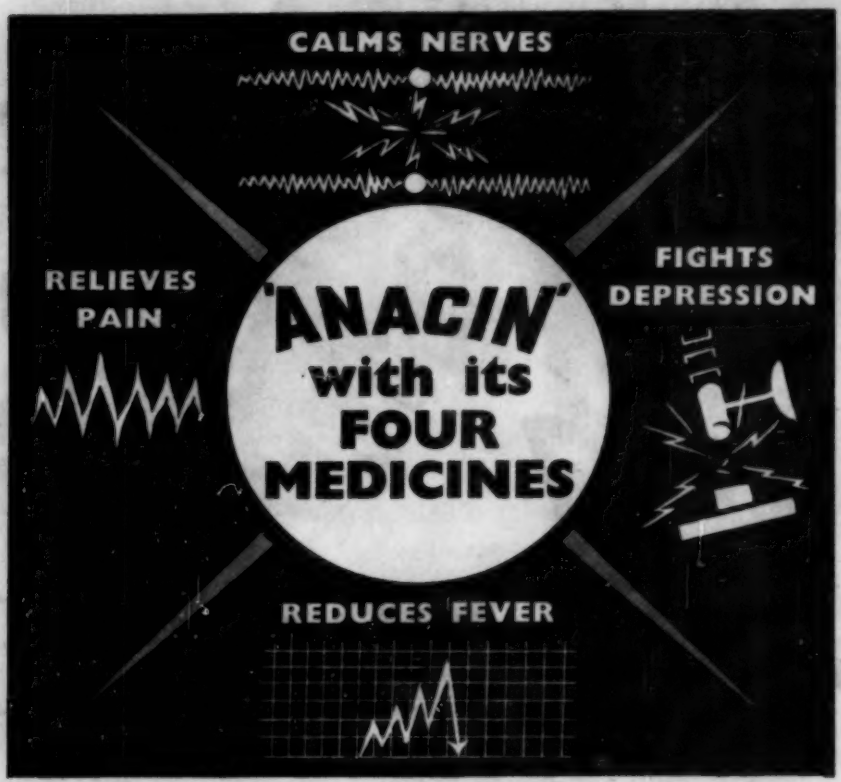

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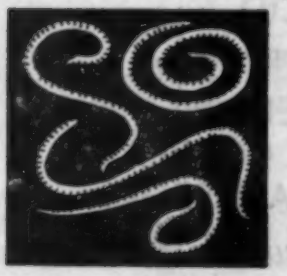

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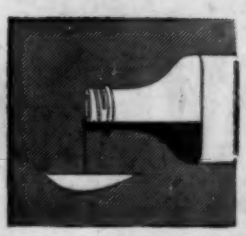

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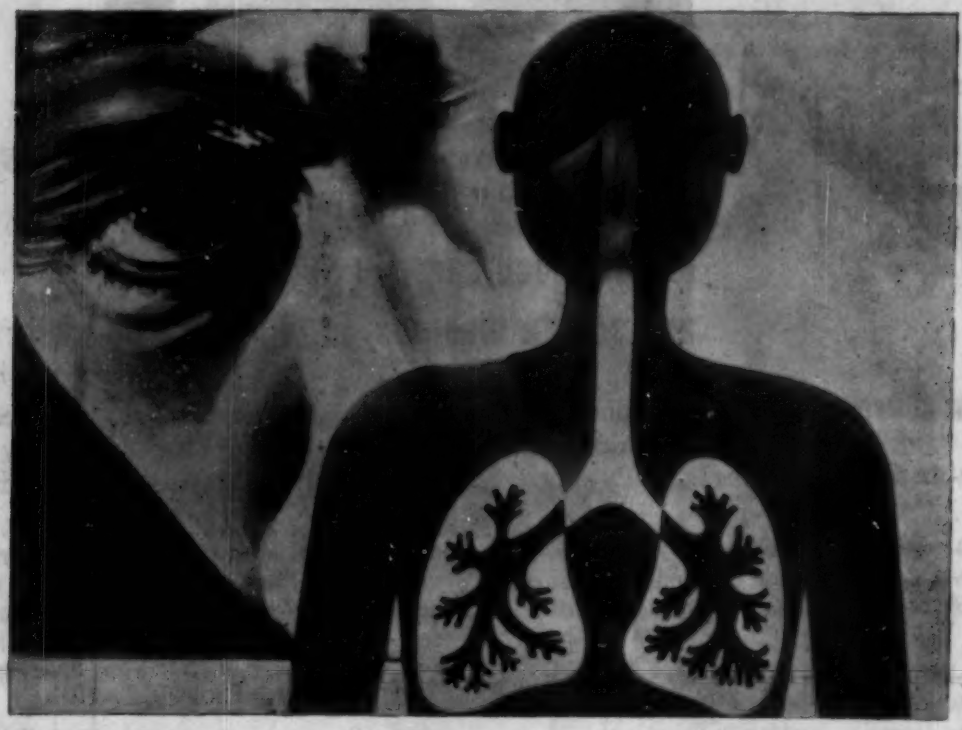

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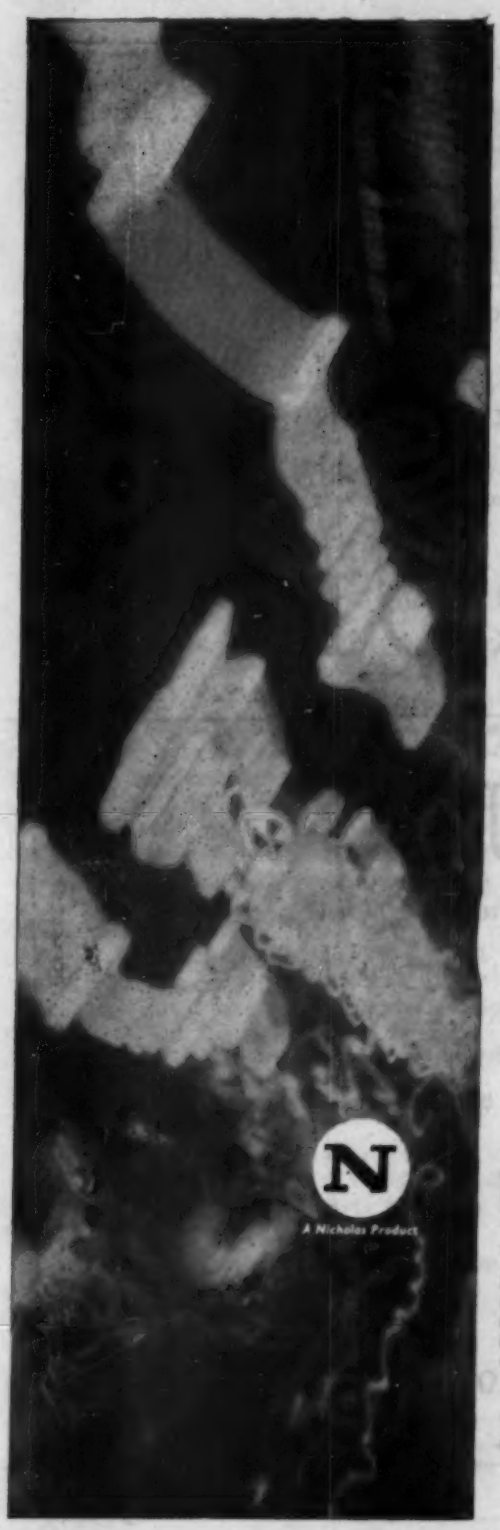

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Journal of the Indian Medical Association

VOLUME 35 NUMBER 6 — PUBLISHED TWICE A MONTH — EDITOR—P. K. GUHA, M.B., M.R.C.S. (ENG.), D.O.M.S. (LOND.) — CALCUTTA SEPTEMBER 16, 1960

ORIGINAL ARTICLES

A STUDY OF 275 CASES OF DIPHTHERIA

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AND

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The incidence of diphtheria in India is high. Intensive prophylactic measures and education of the public in advanced countries have markedly reduced its incidence in recent years. Diphtheria cases form the bulk of admissions in the infectious diseases wards of our hospitals. During 1956 and 1957, 15,906 patients were admitted in the medical wards, of which 2,394 were suffering from infectious diseases. Of the latter, 275 patients had diphtheria and constituted 1·7 per cent of the total admissions into the medical wards and 11·4 per cent of the total admissions into the infectious diseases wards. It is present endemically all the year around, but the maximum incidence occurs during the months of July, August and September.

MATERIAL AND METHOD

275 patients suffering from diphtheria who were admitted into the Medical College Hospital, Nagpur, during 1956 and 1957 were studied by the authors.

On admission they were examined clinically, and the following criteria were laid down for the diagnosis:

1. History suggestive of diphtheria:

   (a) Fever, cough, pain in the throat, dysphagia and dyspnoea.

   (b) Presence of membrane in the throat, nasopharynx or the anterior nasal cavity.

2. Swab smear taken from the site of the membrane was stained for K.L.B. by Loeffler's and Albert's stains.
3. In doubtful cases the diagnosis was confirmed by culture on the Tellurite medium.

CLINICAL STUDY

A total of 275 cases were studied. The majority of them belonged to the poorer classes living mostly (except ten) in the slums of Nagpur.

Age incidence—This is shown in Table 1.

TABLE 1—SHOWING AGE INCIDENCE

Age-groups (years)	No. of cases
Below 1	40
Over 1 up to 2	80
Over 2 up to 4	55
Over 4 up to 6	30
Over 6 up to 9	42
Over 9 up to 12	7
Over 12	6
Total	275

The maximum incidence of diphtheria in our patients was in the age-group of 1 to 2 years (29 per cent). Next in frequency was the age-group of over 2 up to 4 years (20 per cent). Only

6 cases were found above the age of 12 years. We did not get any case below the age of 3 months, but 18 per cent of the cases were below 1 year.

Sex incidence—Of the total cases reviewed 58·7 per cent were males and 41·3 per cent were females.

Seasonal incidence—The maximum incidence (40 per cent) was in the months of July, August and September, gradually decreasing to the lowest incidence of 12·7 per cent in the first 3 months of the year. The increase in the incidence of diphtheria coincides with the onset of rains, when the temperature variations are maximum and the upper respiratory tract infections are common. The seasonal incidence is shown in Table 2.

TABLE 2—SHOWING SEASONAL INCIDENCE

Month	No. of cases	Per cent
January—March ...	36	13
April—June	41	15
July—September ...	110	40
October—December ...	88	32
Total ...	275	100

Presenting symptoms and signs—These are shown in Table 3.

TABLE 3—SHOWING ANALYSIS OF INCIDENCE OF THE PRESENTING SYMPTOMS

Presenting symptoms and signs	Incidence (per cent)
Fever	89
Cough	62
Pain in throat	36
Dyspnoea	35
Hoarseness	13
Inability to take feeds	9
Restlessness	8
Swelling of the neck	6
Change in voice	4
Ulcer or membrane in the mouth or throat ...	4
Nasal discharge	2
Diarrhoea	1
Convulsion	0·5

The commonest presenting symptoms were fever, cough, pain in the throat or dyspnoea. 89 per cent of the cases were febrile and 62 per cent had cough. Dyspnoea was present in 33 per cent only.

Duration of illness—This at the time when patients were first seen varied from less than 24 hours to more than 6 days, but in 40 per cent of the cases the duration of illness was 3 to 4 days (Table 4).

TABLE 4—SHOWING DURATION OF ILLNESS AT THE TIME OF ADMISSION

Time lapse between onset of symptoms and admission	No. of cases
Within 24 hours	12
Over 24 hours up to 2 days	81
Over 2 days up to 4 days	108
Over 4 days up to 6 days	46
Over 6 days	28

History of contact (with a case of diphtheria)—In three patients there was in each case a history of contact in the family while in three others history of diphtheria in the locality was available.

Number of attacks—Three cases had recurrence of diphtheria for the second time.

Pulse, respiration and temperature—The pulse rate was between 60-80 per minute in 2 cases, between 81-100 in 32 cases, between 101-120 in 49 cases, between 121-150 in 154 cases and above 150 in 38 cases.

The respiration rate was between 20-30 per minute in 151 cases, between 31-40 in 80 cases and above 40 in 43 cases.

The temperature was normal in 56 cases, 99°F in 91 cases, between 99°F-102°F in 123 cases and above 102°F in 5 cases.

Of the above cases, 34 had stridor, 40 had dyspnoea with indrawing of the intercostal spaces, 3 had cyanosis and 68 had bronchopneumonia. 44·7 per cent of cases had temperature 99-102°F.

Toxaemia and peripheral circulatory failure—Toxaemia was graded into mild, moderate and severe varieties by noting the colour of the skin, the mental alertness, the amount of physical lethargy and the state of the pulse. A severely toxic case had extreme physical and mental lethargy, a marked pallor of the skin and the pulse was low in volume and tension.

The incidence of toxaemia and peripheral circulatory failure and their relation to mortality is shown in Tables 5 and 6 respectively.

TABLE 5—SHOWING INCIDENCE OF TOXAEMIA AND ITS RELATION TO MORTALITY

Degree of toxaemia	No. of cases	No. of deaths	Mortality rate (per cent)
Severe ...	40	32	80
Moderate ...	62	10	16

TABLE 6—SHOWING INCIDENCE OF CIRCULATORY FAILURE (C.F.) AND ITS RELATION TO MORTALITY

Degree of C.F.	No. of cases	No. of deaths	Mortality rate (per cent)
Severe (pulseless with or without cyanosis) ...	6	6	100
Moderate (feeble pulse) ...	22	13	55

48 per cent of the patients were toxic on admission, of which 30 per cent were severely so. Out of the severely toxic cases 9 were associated with 'bull-neck' and one had haemorrhagic diphtheria. Peripheral circulatory failure was present in 28 cases and was severe (pulseless with or without cyanosis) in 21·4 per cent of them.

Topographical classification — Submandibular lymph nodes were enlarged in 44 and cervical in 45 cases. Tonsillar enlargement was seen in 75 cases (27 per cent).

Table 7 shows topographical classification and its relation to mortality.

TABLE 7—SHOWING TOPOGRAPHICAL CLASSIFICATION AND ITS RELATION TO MORTALITY

Type of diphtheria	No. of cases (275)	No. of deaths (55)	Mortality rate (per cent)
Nasal	6	Nil	Nil
Unitonsillar	50	3	6
Bitonsillar	88	16	18·1
Pharyngeal (posterior pharyngeal wall)	7	Nil	Nil
Palatal (soft)	2	1	50
Uvular	3	1	33
Unitonsillar and nasal ...	1	Nil	Nil
Unitonsillar, nasal and pharyngeal	1	1	100
Tonsillar and pharyngeal ...	15	3	20
Unitonsillar and palatal ...	9	3	33
Tonsillar, palatal and/or uvular	54	14	25·9
Tonsillar, palatal, uvular and/or posterior pharyngeal ...	22	7	31·8
Buccal, tonsillar and genital	1	1	100
Buccal, with other combinations of membrane in throat	13	5	38·4
No membrane (visible) ...	3	Nil	Nil
Special types (from above):			
Laryngeal diphtheria in various combinations ...	56	26	46·4
Bull-neck	9	3	33
Haemorrhagic	1	1	100

TREATMENT

All the cases were given antidiphtheritic serum (A.D.S.) according to the principles laid down in Table 8 and after testing sensitivity to serum.

TABLE 8—SHOWING DOSAGE OF A.D.S. IN UNITS ACCORDING TO THE SEVERITY OF THE CASE

Toxaemia	Membrane in throat and nasopharynx: One patch	Two patches at two sites	More than 2 patches or extensive
Mild ..	10,000	20,000-30,000	Rare cases 40,000-80,000 (½ or more I.V.)
Moderate ..	20,000-40,000	40,000-60,000	60,000-100,000 (½ or more I.V.)
Severe ..	60,000-100,000 (½ or more I.V.)	80,000	100,000 or more (½ or more I.V.)

N.B.—A.D.S. was given by deep intramuscular injection, except where specified.

Intramuscular injections of crystalline penicillin were given in dosage of 200,000 units, t.d.s., below the age of 5 years and 400,000 units, t.d.s., above that age.

Toxic cases and those with laryngeal obstruction or bronchopneumonia were given oxygen through a nasopharyngeal catheter, at the rate of 6 to 7 litres per minute.

Glucose was given with milk feeds. Tea and coffee were allowed.

Patients with mild diphtheria were allowed up after 10 days, moderate cases after 20 days and severe cases after a month or more.

In cases of laryngeal diphtheria tracheotomy was done when indicated.

COMPLICATIONS

The following complications are mentioned:

Bronchopneumonia was found in 60 cases, cardiovascular failure in 38 cases, palatal paralysis in 4 cases, pharyngeal paralysis in 2 cases, extra systoles in 1 case and serum sickness in 24 cases. The small incidence of paralysis was due to the fact that the discharged patients were lost sight of on account of not reporting back for examination.

MORTALITY

Out of 275 cases of diphtheria admitted during the years 1956 and 1957, 55 cases (20 per cent) expired. Among 56 cases where laryngeal involvement was present 26 (46·4 per cent) died. Excluding cases of laryngeal diphtheria the

mortality was 13·6 per cent. Out of 55 cases who expired, 8 were admitted in a very low condition and died before treatment could be effective. Two other cases were severely anaemic (20 and 25 per cent Hb.) and died in spite of initial improvement. In these cases anaemia must have been a major cause of death. Another patient died of severe enteritis and dehydration on the fourteenth day of admission. If these 11 cases are excluded, the mortality is 16 per cent in the present series, and 8·9 per cent if cases of laryngeal diphtheria are excluded. Parikh and Thanawala (1959) report a mortality of 4·7 per cent in 127 cases treated by them.

The maximum deaths were in the first 24 hours after admission (Table 9).

TABLE 9—SHOWING TIME OF DEATH AFTER ADMISSION, AND NUMBER OF DEATHS

Time of death after admission	No of deaths
Within 24 hours	25
Over 24 hours up to 48 hours	11
Over 48 hours up to 72 hours	7
Over 72 hours	12

Relation of mortality to age-group—Mortality was maximum under the age of 1 year and became progressively less with the advance in age. There was no mortality above the age of 9. From Table 10 it is seen that mortality increased from 2·9 per cent in the age-group of 4-6 years to 9·5 per cent in the age-group of 6-9 years.

Relations of mortality to toxaemia, circulatory failure and type of diphtheria—It is clear from Table 5, 6 and 7 that 80 per cent of the severely toxic patients expired as against 16 per cent where toxaemia was moderate. There was hundred per cent mortality in cases where circulatory failure was severe and 55 per cent where it was moderate. There was no mortality in nasal diphtheria. Mortality was 38·4 per cent when oropharyngeal involvement was present. It was 6 per cent in unitonsillar and 18·1 per cent in bitonsillar diphtheria (Table 7).

TABLE 10—MORTALITY RATE (PER CENT) IN DIPHTHERIA CASES IN DIFFERENT AGE-GROUPS

Age-group (years)	Mortality rate (per cent)		
	Diphtheria in general	Laryngeal diphtheria	Diphtheria excluding laryngeal variety
0 to 1	50	50	50
Above 1 up to 2 ...	18·8	60	5
Above 2 up to 4 ...	18·8	25	15·7
Above 4 up to 6 ...	2·9	33·3	0
Above 6 up to 9 ...	9·5	0	9·5
Above 9	0	—	0

DISCUSSION

Diphtheria occurs endemically and epidemically throughout the year particularly in temperate zones. From the present series of 275 cases and from other papers including those of Soman and Nail (1949), Parikh and Thanawala (1959) and Laha and Misra (1957), it appears that diphtheria is still common in India, though the incidence in western countries has fallen appreciably in recent years. Laha and Misra (1957) collected 804 cases of diphtheria in over 3 years. In Nagpur, diphtheria occurs endemically through the year but its incidence was found to be the highest during the months of July, August and September (Table 2). This increase in the incidence of diphtheria coincides with the onset of rains when variations of temperature are maximum, and upper respiratory tract infections are common and unhygienic conditions usually prevail.

The maximum incidence was found in the age-groups of 1 to 2 years (29 per cent) and 2 to 4 years (20 per cent), forming 49 per cent of the total cases. This differs from the textbook description of maximum incidence in the age-group of 2 to 5 years. There was no case below the age of 3 months, though 17·9 per cent of our cases were below the age of 1 year. This finding is inconsistent with the observations in the Western countries, where diphtheria is rare below 1 year. Our findings are in agreement with those of Laha and Misra (1957) who found incidence of 36 per cent below 1 year with more or less the same seasonal incidence. Parikh and Thanawala (1959) found the age-group of 3 to 5 years commonly affected. It is our impression that this applies to our country in general, though actual statistics are lacking. The incidence of diphtheria below 1 year can be explained by the low humoral immunity transferred by undernourished mothers and acquired by children due to malnutrition and lack of active immunisation which is practised in advanced countries. There was a rise in the incidence of diphtheria in the age-group of 6 to 9 years (Table 1) which is the school-going period where contact with carriers could be held responsible for increase in the incidence of diphtheria. There were only 6 cases of diphtheria above the age of 12 years in the present series as against the rising incidence in the higher age groups in the western countries, due to prophylactic immunisation during infancy. In fact during the epidemic

in Halifax in 1940-41, 69·2 per cent of cases were over 15 years. As the mass immunisation campaign gets popular in this country we expect a shift in the diphtheritic susceptibility to the higher age-groups.

Males predominated in the ratio of 1·4 male to 1 female. Most of the patients (40 per cent) were admitted after 2 to 4 days of the onset of symptoms and only 12 cases (4·5 per cent) within 12 hours of the onset of symptoms.

Generally in infants symptoms of cold and cough are ignored and it is only when the child begins to get difficulty in respiration, refuses to take feeds or develops swelling of the neck that he is brought to the physician. It is also probable that some cases pass undetected in the early part of the illness, due to incomplete examination and lack of high index of suspicion on the part of the medical attendant. In older children pain in the throat, cough and swelling of the neck usually bring the patient to the physician.

The mortality in our series was 20 per cent. In laryngeal diphtheria it was 46·4 per cent. Excluding moribund cases the mortality was 16 per cent. Out of the 9 cases of 'bull-neck' diphtheria 3 expired. The maximum number of deaths was within 24 hours of admission. It is not unusual to find that the patient whose initial progress is satisfactory suddenly collapses and dies within minutes. This occurred in 8 of our patients. This can probably be explained by severe damage to the myocardium and vasomotor system which fail to recover due to irreversible fixation of the exotoxin, though in some cases acute adrenal failure may be responsible for the collapse.

Mortality bears close relationship to age, type of diphtheria, and delay in starting the treatment. It was maximum below 1 year, irrespective of the type of diphtheria (Table 10). Laryngeal diphtheria was mainly responsible for mortality in patients 1 to 2 years of age while it was entirely responsible for the death of those between the age of 4 and 6. In the age group of 6 to 9 years the mortality was due to diphtheria other than laryngeal. These observations are significant. There was no mortality above the age of 9 years.

The case fatality was 6 per cent in unitonsillar diphtheria, while in bitonsillar it was 18 per cent. The mortality increased with extension of membrane. There was no mortality in nasal diphtheria. It was 16·6 per cent in patients admitted within 24 hours of the onset of symptoms as against 32·1 per cent when the symptoms were of more than 6 days' duration.

The mortality (20 per cent) in our series is higher than the series described by Laha and Misra (1957), and Parikh and Thanawala (1959) who found a mortality of 11·9 per cent and 4·7 per cent respectively. Excluding moribund cases they found a mortality of 3·5 per cent and 3·15 per cent as against that in the present series which was 16 per cent. This high mortality in our cases could be partly explained by the delay in admission of the patients and a greater number of laryngeal diphtheria cases encountered (56). Fatality rate in diphtheria is about 3·5 per cent as quoted in western text-books. In our country the mortality rate is still high though actual statistics are lacking.

General prognosis in diphtheria depends on the stage of the disease and adequacy of treatment. When specific treatment is carried out on the first day of the disease the mortality rate is about 0·3 per cent, on the 3rd day 4 per cent, on the 4th day 12 per cent and on subsequent days 25 per cent. This partly explains the high mortality in cases who receive the antitoxin late. In our cases the highest mortality occurred under 1 year of age. The reduction of incidence of diphtheria in this age-group can be achieved by (i) increasing the nutritional state of the mothers and infants, and (ii) compulsory active immunisation in early infancy.

The mortality in the higher age-groups, mainly 1 to 2 years and 4 to 6 years, can be tackled by early and proper treatment of laryngeal diphtheria.

The value of early tracheotomy should be emphasised, as any delay exhausts the child and increases toxaemia with its attending circulatory damage. It is important to bear in mind that the majority (95 per cent) of our cases of laryngeal diphtheria have membrane in the pharynx or nasopharynx and are associated with marked toxaemia. The age group of 6 to 12 years should be protected by giving a booster dose of diphtheria toxoid.

Summary

275 cases of diphtheria were studied during 1956 and 1957. Diphtheria is still common in our country. In Nagpur, diphtheria occurs endemically throughout the year, with the highest incidence during the months of July, August and September.

The maximum incidence was found in the age groups of 1 to 2 and 2 to 4 years. Diphtheria is still common in this country under the age of 1 year and rare over the age of 10 years. Male patients predominated.

The late admission of the diphtheria cases is significantly brought out in our series as only 4·2 per cent (12 cases) were admitted within 24 hours

of the onset of symptoms while 40 per cent cases were admitted with symptoms of 2 to 4 days' duration.

89 per cent of the cases were febrile and 38 per cent of them were dyspnoeic. Toxaemia was present in 48 per cent of cases and circulatory failure in 10 per cent.

Tonsillar diphtheria, either unitonsillar or bitonsillar, accounted for 50 per cent of our cases. There were 56 cases of laryngeal diphtheria (20·5 per cent). Bronchopneumonia, circulatory failure, bull-neck and serum sickness were the commonest complications. Acute circulatory failure was an unexpected and dreaded complication.

Total mortality was 20 per cent but excluding the moribund cases it was 16 per cent. In laryngeal diphtheria mortality was 46·4 per cent. The causes of high mortality in diphtheria in our country and particularly in the present series are discussed and remedies suggested.

ACKNOWLEDGMENT

Our thanks are due to Dr. G. V. Barve, the Dean, for allowing us to publish the clinical material and to Prof. J. N. Berry of Medical College and Hospital, Nagpur, for assistance received from him.

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ASSOCIATION OF PEPTIC ULCER AND PULMONARY TUBERCULOSIS

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The association of peptic ulcer and pulmonary tuberculosis has been the subject of recent investigation, with special reference to their incidence and the influence of one upon the other.

Winkelbauer and Frisch (1927), quoted by Balint (1953), reported 4 patients who developed fulminating type of pulmonary tuberculosis following subtotal gastrectomy. Ameulle *et al* (1943), quoted by Frucht *et al* (1957), reported 2 cases of pulmonary tuberculosis following the operation, but no preoperative evaluation was made in these cases. Olmer and Huguet (1947), quoted by Frucht *et al* (1957), reported 4 patients with pulmonary tuberculosis following gastrectomy, but again no preoperative evaluation was made. Isorni *et al* (1948), quoted by Waingortin and Lorge (1958), presented 26 patients with gastrectomies from 742 admissions for pulmonary tuberculosis; and 13 of these patients had no manifestation of tuberculosis before operation. Hartman (1952), quoted by Frucht *et al* (1957), described a series of 128 gastrectomies of which 100 cases were followed up and pulmonary tuberculosis was found in five only.

Hillemand *et al* (1952), quoted by Balint (1953), made a 10-year follow-up study of 180 out of 312 consecutive gastrectomies and found 28 cases developing some form of tuberculosis at the end of 10 years. Tanner (1954) reported a follow-up study of 611 patients after partial gastrectomy and found that 12 had since developed pulmonary tuberculosis. Pearson (1954) reviewed various surgical series and concluded that in 2,500 gastrectomies done the incidence of pulmonary tuberculosis was 2 per cent but when the follow-up was for a period greater than 5 years it went up to 4 per cent. Anderson *et al* (1955) found that of those patients surviving partial gastrectomy 3·3 per cent had pulmonary tuberculosis. Bowman (1956) found that the death rate from pulmonary tuberculosis among 395 cases of gastrectomy for peptic ulcer was significantly higher than among the total population of Stockholm.

Warthin (1953) reported 7 cases of active pulmonary tuberculosis out of a series of 386 cases of partial gastrectomy; 6 of these cases were known to have varying degrees of pulmonary tuberculosis activity.

Thorn *et al* (1956) reported an attack rate of pulmonary tuberculosis of 5·8 per 1000 per annum in their male patients over the age of 35 who had partial gastrectomy. Neubert (1958) reviewed 32 patients with pulmonary tuberculosis who previously had undergone gastrectomy and concluded that these cases were more prone to develop pulmonary tuberculosis.

Balint (1953) studied mortality figures from pulmonary tuberculosis in 2413 patients who were followed up after partial gastrectomy for peptic ulcer and noted a significant increase in the number of deaths from this cause. Winkelbauer and Frisch (1927), Brouet *et al* (1952), and Rosner (1953), all quoted by Balint (1953), and Thorn *et al* (1956) stated that after partial gastrectomy pulmonary tuberculosis is particularly severe.

Dumee (1954) thought that gastrectomy predisposes to active pulmonary tuberculosis, and assumed that the stress of the operation gave rise to increased liberation of cortisone. On the other hand, Gaviser (1948) believed that partial gastrectomy was not related to pulmonary tuberculosis.

Steel and Johnston (1958) made comparative studies of medical and surgical treatment of peptic ulcer with regard to their effect on the natural history of pulmonary tuberculosis, and concluded that any adverse effect which peptic ulcer may have on pulmonary tuberculosis is unlikely to be much increased by partial gastrectomy. On the other hand, Swynnerton and Tanner (1953) found that out of 233 patients followed up after partial gastrectomy, 6 died of pulmonary tuberculosis, and out of 256 cases treated medically only 3 subsequently died of pulmonary tuberculosis.

Waingortin and Lorge (1958) studied the development of peptic ulcer in 27 cases of pulmonary tuberculosis and discussed the role of physical and emotional stress and the irritating action of oral medication in the pathogenesis of peptic ulcer.

Material and Method

From a series of 180 cases of pulmonary tuberculosis treated in Dagenham Hospital 26 cases of pulmonary tuberculosis associated with peptic ulcer were studied. They were divided into 4 groups:

Group A consisted of 14 cases with history of partial gastrectomy for peptic ulcer.

Group B consisted of 4 cases with history of gastro-enterostomy for peptic ulcer.

Group C consisted of 5 cases, most of whom were not diagnosed until laparotomy was done for perforation of peptic ulcer. No partial gastrectomy or gastro-enterostomy was performed in these cases.

Group D consisted of 3 cases with long history of peptic ulcer, but no surgical interference was made.

Data were collected under the following heads:

1. Incidence of peptic ulcer in patients admitted for pulmonary tuberculosis.
2. Age and sex of the patient.
3. Lag period, i.e., the period between operation of partial gastrectomy or gastro-enterostomy and the appearance of symptoms of pulmonary tuberculosis.
4. Progress of the disease while in hospital.
5. The effect of surgical interference for non-pulmonary conditions in 3 cases of Group A.

Result

The co-existence of pulmonary tuberculosis and peptic ulcer occurred in 14·4 per cent of cases, and a history of partial gastrectomy was present in 7·7 per cent of the cases.

Table 1—Showing Distribution of Cases according to Age-groups

Age-groups (years)	31-40	41-50	51-60	61-70	71-80
No. of cases ...	2	6	7	8	3

The age of the patients ranged from 32 to 76 years (Table 1) and the highest number of cases fell in the age-group of the sixties. Of the patients 25 were male and 1 female. It was difficult to decide the lag period accurately (i.e., the period elapsing between partial gastrectomy or gastro-enterostomy and the diagnosis of pulmonary tuberculosis) as many patients had no examination of the chest by x-ray before operation for peptic ulcer. As judged from the history it ranged from 4 weeks to 33 years.

Out of 26 cases, cavities were found on plain x-ray film or on tomogram in 22 cases, 13 cases had bilateral and 9 had unilateral cavities. Of 13 cases with bilateral cavities, 7 belonged to Group A. Sputum was negative on culture in only 1 case.

Progress were extremely slow in patients of Group A, only 2 cases showed much improvement and others remained rather stationary. Calcification and fibrotic type of lesion, suggesting more resistance, was noted in only one case.

In Group B, 3 out of 4 cases had unilateral disease and only 1 case showed a progressive lesion; others showed much improvement in contrast to Group A patients. In Group C, except for 1 case in which pneumoconiosis was combined with tuberculosis, other cases had much less severe disease and made rapid progress towards recovery.

One patient in Group A had hemiglossectomy for cancer of the tongue. No difference in the pulmonary condition was observed in the post-operative period, while in the other two cases the pulmonary condition became worse in the post-operative period. In one of these cases lumbar sympathectomy was performed for Raynaud's disease, and in the other laparotomy was performed for intestinal obstruction due to adherent loop of jejunum. The details of the cases under review are shown in Table 2.

Discussion

Advances in medicine and surgery have improved the mortality figures of peptic ulcer as well as of pulmonary tuberculosis. There has been a steady increase in the incidence of tuberculosis in the older age-group. In England, in men over 65 years, the incidence has risen from 50 to over 80 per 100,000 population since 1938 (Wilkins,

TABLE 2—SHOWING ANALYSIS OF THE CASES UNDER REVIEW

Name, age (years) and sex	Diagnosis/Treatment	Pulmonary and other symptoms, etc.
	GROUP A CASES	
J.W. ...	Duodenal ulcer since 1945	3-4 weeks after operation bilateral cavitation; —ve sputum; acute bronchogenic spread; normocytic hypochromic anaemia; slow improvement.
W.C., 50, male ...	Gastric ulcer since 1947	15 months after operation (1952) extensive bilateral cavitation; not much change.
P.W., 56, male ...	Partial gastrectomy in 1945	Acute symptoms 3 years after operation. 2nd admission (1958) showed marked clearing up of unilateral lesion with cavity.
F.L., 60, male ...	Operated in 1948	After 10 years admitted with acute symptoms; bilateral cavities; progressive; developed secondary amyloidosis.
W.H., 32, male ...	Operated 3-4 years ago	In 1950 March admitted with *unilateral* exudative lesion with breakdown; positive sputum; slight improvement and sputum conversion.
J.B., 48	Perforated pyloric ulcer 1947	2 years after Billroth : Chest trouble and unilateral infiltrative lesion; improved with treatment.
	Partial gastrectomy (Billroth) in 1954	Again admitted in 1950, with unilateral lesion but more severe; improved with treatment. Sputum negative all through.
W.G., 68	20 years ago had gastroenterostomy; 10 years ago partial gastrectomy	Insidious onset; calcified lesion; evidence of old pleurisy. Patient's father suffered from pulmonary tuberculosis 30 years ago.
H.S., 71, male ...	1928 Gastroenterostomy 1951 Partial gastrectomy 1953 Retropubic prostatectomy	8 years after partial gastrectomy bilateral lesion with cavities; sputum positive; very slow progress.
F.S., 70, male ...	Duodenal ulcer, first dignosed in 1950	In 1950, calcification of right apex and lower zone; in 1955, left-sided pleural effusion. In 1950, bilateral advanced lesions; positive sputum; macrocytic anaemia; showed much improvement.
H.H., 66	Duodenal ulcer since 1918. In 1954 had perforation and partial gastrectomy; satisfactory post-operative progress. Followed up until 1957	Pulmonary tuberculosis diagnosed when x-rayed before operation for cataract. Bilateral disease with cavitation; positive sputum on 14-4-58; left hemiglossectomy for cancer of tongue. X-ray after operation similar to one before lung lesions; cavity persisting.
C.S., 46, male ...	Laparotomy for perforated peptic ulcer in 1949. In 1957 partial gastrectomy	History of pleurisy in 1942. Normal x-ray 8 months before. On 25-1-59, unilateral fibrotic lesion with a cavity. Could not be followed up.
J.G., 50, male ...	Gastric ulcer diagnosed in 1949. In 1951 had partial gastrectomy. On 20-8-59 admitted with obstruction of adherent loop of jejunum	In 1946, infiltrative lesion, unilateral. Disease progressed in spite of collapse measures. In 1958, extensive calcified deposits on both sides. In 1959 bronchopneumonic patch spread to right lower half of lung fields.
W.G., 50, male ...	Partial gastrectomy in 1945	Insidious onset of pulmonary symptoms after 12 years of operation. Admitted with history of haemoptysis and loss of weight; bilateral cavities; sputum positive; improvement occurred. Lumbar sympathectomy of Raynaud's disease; marked increase of disease after operation.
G.G., 51, male ...	Duodenal ulcer perforated in 1940. Partial gastrectomy in 1947	Insidious onset, with weakness and malaise and loss of weight. X-ray : right side cavity with infiltration all round; sputum —ve; slight improvement occurred.

TABLE 2—*Contd.*

Name, age (years) and sex	Diagnosis/Treatment	Pulmonary and other symptoms, etc.
	GROUP B CASES	
J.G., 49, male ...	Peptic ulcer for 24 years. On 27-5-57 gastro-enterostomy and vagotomy done	On 31-7-58, i.e., about 1 year after operation, patient was admitted with acute symptoms. Bilateral cavitation; sputum positive; good progress, and sputum conversion took place.
A.L., 73, male ...	Gastro-enterostomy done 34 years ago for gastric ulcer	Admitted with cough and hoarseness; on right side thick-walled cavity and on left side infiltrative lesion; sputum −ve; much improvement. No cavity seen on tomogram. Sputum conversion took place.
R.D., 66, female	Gastro-enterostomy done 2 years ago	Pulmonary tuberculosis diagnosed in 1939. Comparing the film of 1943 the disease seemed to have remained limited to the right apex. Slight improvement in the hospital.
M.B., 52 female	Gastro-enterostomy done in 1936 for gastric ulcer	First diagnosed in 1953. Insidious onset; fibrocaseous type of lesion with areas of breakdown, which later on progressed to well-defined cavities on both sides.
	GROUP C CASES	
F.P., 53, male ...	In 1949 operated on for perforated duodenal ulcer	On 17-11-58 admitted with cough, haemoptysis and loss of weight; x-ray of chest showed bilateral cavities with exudation around; made much improvement. Cavity persisted on left side; sputum converted.
E.T., 52, male ...	Operated for perforated duodenal ulcer 2 years ago	Detected on Mantoux reaction in 1958. X-ray: infiltration of right apex; much improvement on treatment and on 18-2-59 bronchogram showed unilateral bronchiectasis in posterior segment. Sputum −ve all through.
M.C., 64, male ...	Duodenal ulcer perforated in 1926	In April 1959 admitted with many symptoms. X-ray showed exudative lesion of recent origin in right upper zone and fibrotic lesion in left apex; no cavity on tomogram; Sputum −ve. Some clearing of lesion; sputum conversion took place.
J.R., 63, male ...	Duodenal ulcer perforated in 1939	On 4-7-59 admitted with complaints of dyspnoea and cough and on x-ray examination multiple cavities found on both sides with fluffy shadows suggestive of pneumoconiosis. Sputum −ve; not much improvement.
H.G., 64, male ...	Perforation of peptic ulcer in 1945	In June 1959 admitted with cough; +ve sputum; haemoptysis; x-ray showed fibrotic change in right apex; probable cavity in upper zone of left side. Sputum −ve. Considerable improvement.
	GROUP D CASES	
C.T., 76, male ...	Duodenal ulcer diagnosed in 1957	Pleural effusion 1951. Admitted in 1958 because in the routine check-up the sputum was −ve and x-ray showed cavity on right side and fibrotic lesion on left side. Disease remained stationary.
E.G., 67, male ...	Peptic ulcer for 22 years	In August 1958 admitted with cough and lassitude. X-ray: bilateral cavities; sputum −ve. Could not be followed up.
H.D., 64, male ...	Duodenal ulcer diagnosed in 1953	In 1943 pulmonary lesion was suspected on Mantoux reaction. In 1958 patient complained of depression and weakness with cough and sputum. X-ray showed bilateral cavities; sputum −ve. Improvement noticed, but cavity persisted.

1956). This may account for the incidence of 14·4 per cent in cases of pulmonary tuberculosis associated with peptic ulcer and 7·7 per cent in cases of partial gastrectomy for peptic ulcer in patients admitted for pulmonary tuberculosis. Brouet *et al* (1952), quoted by Balint (1953), gave the incidence of gastrectomy in patients with tuberculosis as between 1·8 and 2·8 per cent. Gilbert *et al* (1955), while agreeing with the increased incidence of the history of gastrectomy among their tuberculosis patients, noted no difference in the natural history of the disease or in its response to chemotherapy. Thorn *et al* (1956) reported a high figure (10·7 per cent) of co-existence of peptic ulcer in 876 patients with pulmonary tuberculosis. Frucht *et al* (1957) reported 17 cases out of 1,000 admissions to a tuberculosis unit and Janschulte (1957) in an analysis of 1,500 cases of pulmonary tuberculosis found 143 to have peptic ulcers before developing pulmonary tuberculosis, and of these, 70 had partial gastrectomy without any appreciable time lag.

Various explanations have been offered for the close association of these two important diseases. In the early cases of pulmonary tuberculosis stress, and in the late cases nutritional deficiencies (Reutchnick and Demole, 1954), increased outflow of cortisone due to stress of operation (Dumee, 1954), faulty assimilation and metabolic imbalance (Allison, 1955), anorexia, stress and trauma of operation, psychological make-up, autonomic imbalance and asthenic condition (Janschulte, 1957), and malabsorption are the explanations offered for increased incidence of pulmonary tuberculosis after partial gastrectomy. But this is not the whole explanation for the increased incidence. It has been shown by Thorn (1956) and Balint (1953) that if malnutrition was the most important factor one would expect women to fare even worse than men, because women have less satisfactory results after gastrectomy than men (Thorn *et al*, 1956).

Out of the 3 cases operated on for non-pulmonary condition there was aggravation of pulmonary tuberculosis in two cases but the third case showed no alteration in the pulmonary condition in the postoperative phase. This shows a variation in the response depending on the degree of stress and the capacity of the subject to respond to it.

In both the cases in which pulmonary tuberculosis became more severe, major operations had been performed and it seems that in the pathogenesis of pulmonary tuberculosis appearing soon after partial gastrectomy, the non-specific effect of surgical trauma plays a major role in the activation of latent pulmonary tuberculosis.

Summary

Out of 180 cases of pulmonary tuberculosis, 26 cases associated with peptic ulcer were studied. In 14 cases partial gastrectomy was performed for peptic ulcer. 25 patients were male and one was female. The maximum number of patients was in the age-group of 61-70 years. The lag period ranged from 1·4 weeks to 33 years. Pulmonary lesions were more severe and the response to treatment much slower in partially gastrectomised patients than in the other groups. The effect of surgical interference for non-pulmonary disease on pulmonary tuberculosis has been observed and literature on the subject reviewed.

Acknowledgment

The author feels highly obliged to Dr. Weinberger, Physician-Superintendent, Dagenham Hospital, for his valuable suggestion, to Dr. Woodhouse and Dr. David for their co-operation and to Miss Aldertan without whose assistance this article could not have been prepared.

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VENTILATORY FUNCTION TESTS IN FEMALE CHILDREN AND ADULTS

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Pulmonary function tests are now increasingly employed by the clinician for the functional evaluation of resipiratory disability. There are only a few studies on healthy female Indian subjects, and adequate data for normal standards in this group are lacking. Mean values with ranges and standard deviations for vital capacity (VC), timed VC (TVC) and maximum breathing capacity (MBC) were reported in a preliminary note (Singh and Prabhakaran, 1957). Further data correlating function values with physical measurements are presented in this paper.

Materials and Methods

Studies were conducted on 95 healthy female subjects between 6 and 29 years. 70 subjects in the age-group 17-29 were medical students and a few doctors, and the remaining subjects in the younger age-group were school students. No subject with a history of illness or symptoms referable to the cardiorespiratory system was included. Height was recorded in centimeters and weight in kilograms. The body surface area (BSA) was recorded in square meters calculated from the formula of Banerjee *et al* (1958). VC and MBC were recorded with a Collin's 9-litre respirometer, with the soda lime container and valves removed, bell filled with room air, and drum adjusted for fast speed. For VC, the subject was instructed to take a maximal inspiration and then expel all the air forcibly and rapidly. From the expiratory tracing of the curve, the 1, 2 and 3 second TVC were determined with the Segal-Herschfus timed interval ruler. For MBC, the subject was instructed to breathe as deeply and rapidly as possible for about 15 seconds. From the steepest portion of the ventilogram over a 12 second period the MBC was calculated in litres per minute. Three readings were taken in each subject in the standing posture and the highest value accepted. All volumes were corrected for BTPS (Table 1).

Results and Discussion

Age-group 17-29 years—Nearly 80 per cent of the subjects had VC between 2000 and 3000 c.c., and MBC between 80 and 120 l./min. (Fig. 1). The data obtained in Indian subjects by various workers are summarised in Table 2. Bajaj and

Table 1—Showing Age, Height, Weight, BSA, VC, MBC of 95 Subjects Examined

		70 subjects	25 subjects
Age (years) :			
Mean	...	19·3	10·3
Range	...	17—29	6—16
Height (cm.) :			
Mean	...	156·3	134·5
Range	...	142·5—172·5	114—158
Weight (kg.) :			
Mean	...	48·5	24·6
Range	...	35·7—69·2	15—39·5
BSA (m2) :			
Mean	...	1·57	1·04
Range	...	1·33—1·95	0·77—1·41
VC (c.c.) :			
Mean	...	2500	1495
Range	...	1820—3400	940—2465
MBC (l./min.) :			
Mean	...	102	63·7
Range	...	66—148	32—121

Mullick (1959) found that though the values obtained in their subjects differed from those reported in western countries, the mean values were in fair agreement with the values predicted from the equations of Baldwin *et al* (1948). Thompson Wells (1954) however observed that Baldwin's equations gave values too high for VC and too low for MBC. The present findings are in agreement with the observations of Thompson Wells and indicate that the prediction formulae of Baldwin or of Needham *et al* (1954) are not quite

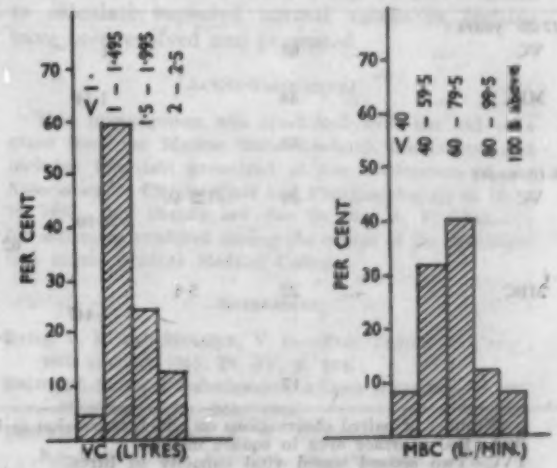

Fig. 1—Showing Percentage of Female Subjects in Different Ranges of VC and MBC in Age Group 17-29 Years

applicable to subjects in this country. It appears inadvisable to assess ventilatory function in Indian subjects by a comparison with western standards. In order to evolve suitable formulae for calculating expected values, an attempt was made to correlate statistically the observed values with physical measurements, and the following regression equations were obtained.

VC (c.c.) = (1) $31 \times$ Ht. (cm.) $- 2288$
(2) $1281 \times$ BSA (m^2) $+ 542$

MBC (l./min.) = $1{\cdot}14 \times$ Ht. $- 73$

The relation of MBC to BSA was just not significant, but the other regressions are statistically significant. The correlation coefficients and standard deviations of all regression equations are shown in Table 3.

TABLE 2—SHOWING DATA OBTAINED IN INDIAN SUBJECTS

Authors	Apparatus	No. of subjects	Age (years)	Vital capacity Mean. c.c.s (with CV %)	Mean TVC % 1, 2 & 3 sec.	Mean MBC l./min.
Mason (1932) ...	Collin's apirometer (non-recording)	(i) 266	16—35 (mostly	(i) 2134 (CV=16·4%)	...	...
		(ii) 587	17—22)	(ii) 2160 (CV=15·3%)	...	...
Krishnan & Varced (1933)	Sanborn apirometer (non-recording)	23	Young adults	2150	...	...
Thompson Wells (1954)	Collin's 9-L respirometer (recording)	50	,,	*	75, 96, 99	*
Benawri *et al* (1959) ...		16	,,	2189 (CV=16·1%)	...	86·35 (CV=16·3%)
Bajaj & Mullick (1959)	Spirometer	17	Adults	2566	81·1, 94·4, 98·3	87·44
Singh & Prabhakaran (1957)	Collin's 9-L respirometer	(i) 70	17—29	2560 (CV=14·4%)	75, 90·1, 96·4	102 (CV=17·2%)
		(ii) 25	6—16	1495 (CV=37·6%)	81, 93·1, 94·7	63·7 (CV=32·2%)

* VC—75 per cent and MBC—111 per cent of predicted values using Baldwin's equation (Actual figures not stated).
CV per cent=Standard deviation as percentage of mean.

TABLE 3—SHOWING REGRESSION EQUATIONS

	n	× age (years)	× Ht. (cm.)	× Wt. (kg.)	× BSA (m^2)	× TVC litres	C	SD	r
17-29 years:									
VC ...	65		31				−2288	333	0·435
					1281		+ 542	335	0·429
MBC ...	48		1·14				− 73	16·7	0·363
					48·0		+ 27·3	...	0·266
	45					18·44	+ 62·9	15·7	0·412
6-16 years:									
VC ...	24	125·44					+ 276	205	0·921
			26·59				−2015	275	0·765
				62			0	198	0·927
					2106		− 690	214	0·871
MBC ...	22	5·4					+ 7·6	11·1	0·839
			1·447				− 129	16·4	0·736
				2·56			0	12·7	0·816
					102·9		− 43	15·2	0·777
	17					48·2	− 7	9·3	0·902

n=Number of paired observations on which regression is based.
BSA=Body surface area in square meters.
TVC=Two second timed vital capacity in litres.
C=Constant in equation. SD=Standard deviation.
r=Correlation co-efficient.
Example of how equation should be read: (1) VC=31 × Ht −2288

Age-group 6-16 years—The distribution of VC and MBC is shown in Fig. 2. Most of the subjects

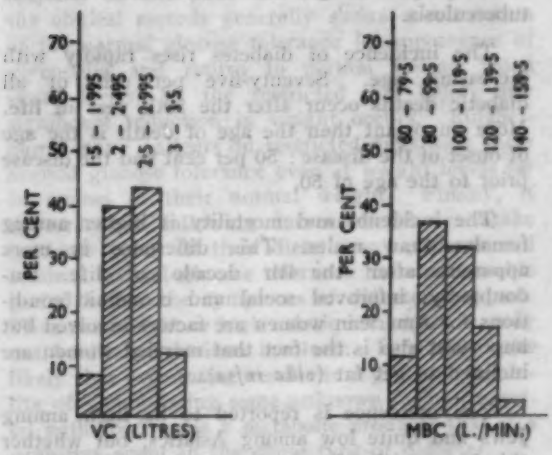

FIG. 2—SHOWING PERCENTAGE OF FEMALE SUBJECTS IN DIFFERENT RANGES OF VC AND MBC IN AGE GROUP 6-16 YEARS.

recorded VC between 1000 and 2000 c.c. and MBC between 40 and 80 l./min. However, in growing children, with increasing physical capacity, ventilatory capacity may be expected to increase progressively, and large deviations from the mean may be expected as is indicated by the high coefficients of variation (Table 2), hence a comparison with the mean value for this age group would be of little significance. Statistical analysis of data showed that both VC and MBC were significantly related to age, height, weight and body surface area—the regression equations being

VC (c.c.) = (1) 125·44 × Age + 276.
(2) 26·59 × Ht. (cm.) − 2015
(3) 62·0 × Wt.
(4) 2106 × BSA − 690.

MBC (l./min.) = (1) 5·4 × Age + 7·6.
(2) 1·447 × Ht. (cm.) − 129.
(3) 2·56 × Wt.
(4) 102·9 × BSA − 43.

Any one of the equations gives good estimates of expected values, but in children the use of all four attributes may be more reliable than the use of any single attribute. For clinical purposes however, such a procedure may not be quite practicable. Since age and weight are statistically found to be the indices most closely related to VC and MBC, an attempt was made to evolve simplified formulae based on these two indices, for easy calculation of expected values. The equations given below, applied to the subjects studied, yielded prediction values very close to the actually observed figures.

VC = 60 (Age + 0·5 × Wt.) + 250 (SD = 156).
MBC = 2·5 (Age + 0·5 × Wt.) + 7 (SD = 10·3)

The formulae are simple and satisfactory, and are recommended for general use in clinical work.

Relation of MBC to TVC—Patients who are very ill may find the MBC test too exhausting to perform, and it has been suggested that TVC which is a simpler test may be used to calculate the expected MBC value. MBC has been variously correlated to 0·75 sec., 1 sec., 2 sec., and 3 sec. TVC. In this study MBC was correlated to 2 sec. TVC, as this value in most subjects was between 90 and 100 per cent, and the following regression equations were obtained:

MBC = (1) 18·44 × 2 sec. TVC in l. + 62·9
(for age group 17-19 years).
(2) 48·2 × 2 sec. TVC in l. − 7
(for age group 6-16 years).

It is suggested that these equations may be usefully employed to calculate MBC from TVC in patients who are unable to perform the more exhausting MBC test.

SUMMARY

Data for VC, TVC and MBC obtained in 95 healthy female subjects between 6 and 29 years were statistically analysed and correlated with physical measurements. The data shows that prediction formulae suitable for subjects of western countries are not applicable to Indian subjects. Regression equations which may be more useful to calculate expected normal values in Indians have been evolved and presented.

ACKNOWLEDGMENTS

This investigation was conducted with the aid of a grant from the Madras State Research Committee, and includes the data presented at the conference of the Association of Physiologists and Pharmacologists of India in 1958. My thanks are due to Mr. S. Prabhakaran for assistance rendered during the course of the investigation at the Madras Medical College.

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PRACTITIONERS' SERIES

DIABETES MELLITUS AND THE MECHANISM OF ACTION OF INSULIN

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Diabetes mellitus is a chronic disease caused by a disorder in carbohydrate metabolism apparently initiated by a disturbance in the action of insulin. A great deal of emphasis has been placed on the hyperglycaemia and glycosuria, the characteristic symptoms of the disease, for if they are permitted to continue uncontrolled serious changes in protein and fat metabolism are likely to occur. The changes in fat metabolism cause the ketosis, acidosis, dehydration, coma and death. Important as hyperglycaemia and glycosuria are in the diagnosis of diabetes, they are not, *pre se*, responsible for the generalised vascular changes associated with the disease. The latter pathological changes go on relentlessly whether the patient's blood and urinary sugar are well controlled or not. Also, although the control of the hyperglycaemia and glycosuria is generally used as an indication of effective insulin action, this does not necessarily mean that a substance that has hypoglycaemic action will be an effective therapeutic agent in the management of the diabetic patient.

Diabetes in the United States is a disease of great importance. It was estimated once that the incidence was about 0·7 to 0·8 per cent, but in communities where a wide application of blood and urine screening tests were made the incidence was found to be almost doube the estimated figure. During the last 50 years the mortality from diabetes has steadily increased and the disease advanced, as the principal cause of death, from 27th to 8th. In many parts of the United States more people today die of diabetes than of tuberculosis.

The incidence of diabetes rises rapidly with increasing age. Seventy-five per cent of all diabetic deaths occur after the 50th year of life. More important than the age of death is the age of onset of the disease : 50 per cent had the disease prior to the age of 50.

The incidence and mortality is higher among females than males. This difference is more apparent after the 4th decade of life. Undoubtedly, improved social and economic conditions for American women are factors involved but important also is the fact that married women are inclined to get fat (*vide infra*).

The incidence is reported to be high among Jews and quite low among Asiatics, but whether this is a racial difference is not clearly established for it seems to be relatively high among persons of sedentary habits irrespective of race.

HEREDITY, OBESITY AND HORMONAL FACTORS

There is evidence that heredity is an important factor in the aetiology of the disease. Diabetes can appear earlier in the offspring than in the parents. This is called 'anticipation'. For instance, at the onset of the disease in young diabetics (10-15 years of age) 20 per cent have diabetic relatives, but 20 years later 55 per cent report a family history of diabetes. Hence a genetic factor can be obscured if parents of diabetic children die of other diseases early in life. The incidence of diabetes among relatives of diabetics is 5 to 6 times higher than that found for the whole population and the data indicate that approximately 41 per cent of the diabetics in the United States have a definite family history of the disease.

In the young there is little relation between obesity and diabetes but the correlation found in adult diabetics who develop the disease after maturity clearly establishes the important role overweight plays in diabetes. Of the so-called 'maturity onset' diabetics 90 per cent are obese at the onset of the disease. The mortality from the disease is also higher among the obese than among the underweight. However, this correlation between obesity and susceptibility should not blind one in considering possible aetiological mechanisms. Although 90 per cent of diabetics are obese, only 5 per cent of obese individuals are diabetic. There are claims that obese diabetics can be cured by weight reduction alone and there

is no doubt that restricted diets do restore to normal the impaired glucose tolerance of the large majority of such patients. But an examination of the clinical records generally shows a restoration of the normal glucose tolerance (disappearance of glycosuria and return to normal fasting blood sugar levels) by the restricted diet before any significant reduction in weight occurs. Furthermore, many patients on restricted diets soon show normal glucose tolerance even at weight levels far in excess of their normal weight. Finally, it appears that following increased caloric intake (patients going off their diets) many patients still retain a normal glucose tolerance for a measurable period before the symptoms of diabetes reappear. Thus overweight or high caloric intake, *per se*, may not be the mechanism involved. It is also quite likely that over-eating results in a greater probability of accumulating some unknown factor (ingested with food or as a metabolic product) that is a causative agent in the obese type of diabetes.

Of the endocrine glands, the greatest attention has been given to the pancreas, anterior pituitary and adrenals. Although the sex hormones and thyroid affect metabolism, it is generally agreed that these play a very minor role, if any, in the aetiology of diabetes. It has been long known that disturbances in pituitary function frequently are associated with disorders in carbohydrate metabolism. For instance, 15 to 20 per cent of acromegalics have diabetes. Patients with Cushing's disease usually have impaired carbohydrate metabolism. Overweight and overheight (an indication of pituitary hyperactivity) frequently occur before the onset of the disease in diabetic children. Removal of the anterior pituitary results in insulin hypersensitivity, spontaneous hypoglycaemia and in an amelioration of experimental diabetes induced by pancreatectomy. Extracts of the anterior pituitary (APE) injected into normal animals induce hyperglycaemia and glycosuria and if the injections are continued for long periods may cause the development of permanent diabetes. The administration of insulin simultaneously with APE will prevent the development of diabetes indicating an antagonism between these hormones. The locus of this antagonism is claimed by some to be at the muscle hexokinase system. However, this has been challenged by a number of investigators (see below). There is some evidence that the diabetogenic factor of the pituitary is mediated, in part, *via* the secretion of the adrenal cortical hormones as removal of the adrenal glands ameliorates pancreatic diabetes in dogs and cats.

The adrenal cortex also secretes hormones that affect carbohydrate metabolism. For instance, patients with Addison's disease are subject to spontaneous hypoglycaemia ; Cushing's syndrome (hypercortinism) and tumours of the adrenal cortex often are associated with decreased glucose tolerance. Diabetes is frequently ameliorated following the onset of Addison's disease. Adrenalectomy in dogs greatly increases their sensitivity to insulin and the injection of adrenal cortical extracts (11 and 17 ketosteroids) into such animals restores carbohydrate levels to normal. Injections of these agents also enhance the pancreatic and anterior pituitary type of diabetes.

The Experimental Production of Diabetes

The role of the pancreas in diabetes has a history that is both illuminating and confusing. There is little question that most of the insulin in the body is formed in the islets of Langerhans. It is also well known that removal of the pancreas, at least in the dog and cat, produces a severe diabetes. It is also possible to produce the diabetic state by injecting alloxan, a drug that causes degeneration of the beta cells of the islets. It is of interest to note, however, that a completely alloxanised diabetic dog has a higher insulin requirement than a dog made diabetic by the removal of the entire pancreas. Also, the latter preparation can survive only 5-10 days without insulin as it develops a severe ketosis while the alloxan diabetic dog survives definitely without insulin (it excretes little acetone). These findings suggest that in the pancreas (at least of the dog), there are substances other than insulin that affect carbohydrate metabolism. It should be mentioned here that there are claims that diabetes, under certain conditions, can be produced by uric acid, a substance related to alloxan.

There are reports that prolonged hyperglycaemia can induce a progressive deterioration of the beta cells and eventual production of diabetes. However, there is a large species difference in susceptibility to this procedure. In cats, reported to be the most susceptible species, the blood sugar must be maintained at very high levels for long periods of time before the disease can be produced.

Results of Removal of the Pancreas from Different Species

Countless dogs have been completely depancreatised and carefully studied. Such preparations, if not given insulin, cannot stay in nitrogen balance, lose weight rapidly, show marked glycosuria, ketonuria and hyperglycaemia and survive only a few days. The administration of insulin to these animals promptly restores the blood sugar to

normal, stops the glycosuria and acetonuria, inhibits excess protein breakdown and weight can be maintained or gained. From these observations, it was proposed that the principal mechanisms of insulin action were: (1) to prevent excessive protein breakdown ; (2) to cause an immediate increase in the oxidation of glucose (thus preventing excessive ketone formation from fat) ; and (3) to store excess carbohydrate as fat.

It is true that thousands of dogs have been depancreatised and studied, but data from such animals only should not tyrannise our thinking. The results of removal of the pancreas from the pig, goat, rabbit, fowl (and even man) should be given equal weight in our considerations regarding the mechanism of insulin action. The results of such comparative studies indicate that the dog and cat behave rather uniquely after the removal of the pancreas ; other species respond somewhat differently. For instance, the depancreatised pig does not survive much longer without insulin than the dog and shows a severe ketosis. However, it does not have as severe a glycosuria, excessive protein breakdown or as high a fasting blood sugar. If it were not for the ketonuria the pig probably would survive much longer without insulin than the dog or cat. The goat is a very interesting animal to depancreatise, not only because of the technical aspects of the operation, but because of the results. This animal survives up to 44 days without insulin and shows only a slight hyperglycaemia, glycosuria, excessive protein breakdown and acetonuria. Fowl, rats and rabbits also show a mild diabetes following removal of the pancreas. The picture is not clear with monkeys due to contradictory results from different laboratories but their cousin, man, appears to bear a closer resemblance to the rat than to the dog—at least as far as the effects of removal of the pancreas are concerned. Thus, it appears that conclusions based on the effects of removal of the pancreas of only one species are quite likely to lead to loose thinking as to the mechanism of insulin action.

The Transformation Theories of Insulin Action

Does insulin act at any specific enzyme-substrate level to produce its effects? For a long while it was held largely because of the work of Naunyn and his colleagues that glycogen formation was an obligatory step in glucose oxidation. This group, impressed by the low liver glycogen in depancreatised dogs, proposed that the important action of insulin was to store glycogen. If this were so, it would follow that the site of insulin action might be at the step where glucose-1-phosphate is converted into glycogen by the enzyme phosphorylase.

During the early period after the discovery of insulin, Best and his colleagues greatly influenced the thinking in regard to the action of insulin. These workers concluded that the primary effect of insulin was to increase oxidation and storage (as glycogen) of carbohydrate. Accordingly this would place the site of action, in respect to oxidation, at some point in the citric acid cycle.

Drury, impressed by the observations that a common defect in all species made diabetic by the removal of the pancreas was their inability to maintain weight, concluded from indirect evidence that the principal action of insulin was to convert excess carbohydrate to fat. From this it would appear that the site of action might be at some point concerned with the synthesis of fatty acids (involving pyruvate or other glucose fragments). If insulin was directly involved in protein synthesis it was supposed it might act either at a point where amino acids were formed from glucose products or where these acids were combined to form polypeptides.

Integrative and Transfer Theories of Insulin Action

As data accumulated, more and more investigators came to the conclusion that if a hormone's function were integrative in nature it should act at a key point controlling a sequence of events rather than at specific enzyme-substrate levels. The work of Cori and his colleagues seemed to provide proof for this concept when they presented evidence that insulin acted at the hexokinase level, a primary transformation essential for many of the subsequent steps in carbohydrate metabolism. However, its action according to Cori, was not by stimulating this phosphorylating system directly, but by antagonising the inhibitory effect of the pituitary hormone at this site. This hypothesis could not be uniformly confirmed by other investigators.

The idea that insulin facilitated the penetration of glucose into the cell is an old one. However it was through the work of Levine and others that direct evidence was obtained for support for such a 'transfer' theory of insulin action. Sometime ago Wierzuchowski showed that galactose tolerance in eviscerated dogs was increased by insulin despite the evidence that galactose was not utilised to any great extent by the extrahepatic tissues. Levine investigated this further and found that most sugars were not as freely permeable as supposed. He found that when

galactose was given intravenously to an eviscerated, nephrectomised dog, it was eventually distributed in a volume equal to about 40-43 per cent of the carcass weight. If insulin was given simultaneously, the distribution volume at equilibrium varied from 68-72 per cent of the body weight, a figure close to the total body water (or the sum of the extracellular and intracellular space). On the other hand when a freely permeable substance such as urea was given intravenously to such an animal it was distributed in a volume equal to 68-72 per cent of the body weight regardless whether or not insulin was given. Levine interpreted these findings to mean that insulin helped transfer galactose from the extracellular compartment into the cell interior. In other words, insulin 'opened up' space for the distribution of galactose. He demonstrated that the various sugars could be classified as 'insulin responsive' or 'nonresponsive', depending upon whether insulin increased their distribution in the body. Sugars that had a configuration on the first 3 carbon atoms identical to that of glucose were responsive to the 'transfer action' of insulin: d-galactose, d-xylose and l-arabinose belonged to this class; sugars such as d-mannose, d-fructose, l-sorbose, d-arabinose, l-rhamnose and d-sorbitol did not respond to the transfer action of insulin. From his studies Levine concluded that the prime function of insulin was transfer: it pushed, rather than pulled, glucose from the extracellular into the intracellular compartment. A primary step for this action probably required the binding of insulin to the surface of the cell. Contra-insulin agents, such as the hormones of the pituitary, on the other hand, did not necessarily act at the same locus as insulin but produced their antagonistic action at a point removed from the site of insulin action—in other words, the 'transfer system' and the hexokinase system, although at the same primary level of cell activity, could be separated functionally, insulin affecting the former, the pituitary acting on the latter.

As is to be expected, most biological theories are incomplete. The indications are that tissues can also be classified as to whether they are insulin responsive. The liver appears to belong to a class that are 'non-responsive'. Common clinical observations have long indicated that the liver is the principal target organ in diabetes. The finding that it is unaffected by insulin is not satisfactorily explained and so continues to make the relation of this organ to the action of insulin one of the most important problems to solve before an understanding of the aetiology of diabetes is achieved and our knowledge of the action of insulin is complete.

PUBLIC HEALTH

NUTRITIONAL STATUS SURVEY OF THE RURAL POPULATION IN SHOLAVARAM*

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INTRODUCTION

The nutritional and health status survey previously conducted in Pennathur (Rao and Rao, 1958) afforded opportunities to test the procedures employed under the conditions found in a South Indian village. This experience was of value in planning a continuing and confirmatory survey in Sholavaram, another village in the same region.

Sholavaram is a revenue village in Vellore Taluq of North Arcot District, about 3·4 sq. miles in area and consists of four distinct geographic areas which will be referred to as blocks. The total population of 2,588 persons was made up of 519 families living in 430 houses.

The climatology, socio-economic conditions, literacy and vital statistics were similar to those of Pennathur. In addition to the objectives given in earlier publications, the present study had the following special objectives:

1. To stimulate improved nutrition in the community by combining a service programme with the survey.
2. To apply only such methods as would be consistent with the economy, local conditions and food habits of the population for combating the recorded deficiencies.

THE SAMPLE AND SAMPLING METHODS

The experience at Pennathur showed no significant differences in nutritional status among the communities. In this study, therefore, the population was arranged according to blocks and a 20 per cent sample was obtained by random numbers. All communities were fairly well represented in the four blocks. The sampling unit was a "family", defined as a composite of individuals,

* The studies were supported by a grant from the Williams-Waterman Fund for the Combat of Dietary Diseases of the Research Corporation, New York, N.Y., U.S.A.

generally consisting of a husband, wife and children, partaking at a common kitchen.

To ensure valid and reliable prevalence estimates, (Hansen and Hurwitz, 1946), great care was taken from the beginning of the study to reduce the amount of non-response by making frequent home visits, paying special attention to children and old people and providing prompt medical attention for the participating families.

Since the beginning of the study in October 1957, a few members of the selected families left the village for military service and a few died. Some families moved from the village in quest of work and others refused to participate.

Substitute families, similar with regard to their residential qualification, community, occupation and population characteristics, were chosen for replacement. 103 families consisting of 538 individuals participated in the study.

Survey Technique and Methods

The method of survey chosen for the study was a composite of procedures previously described for survey work which promised to yield information which could be compared with the results reported by others. They were as follows:

A. MEDICAL HISTORY:

A careful clinical history with special probing for any symptoms of nutritional deficiency was obtained by interrogating the individual.

B. PHYSICAL EXAMINATION:

The survey group consisted of interns posted for a three month period in the Department of Preventive and Social Medicine. All the interns posted by rotation received training in recognition of the clinical signs of malnutrition and in survey techniques.

The examination centre was the Rural Hospital of the Primary Health Unit. This had been designed to serve the village patients in the Unit Area. The following techniques were followed for the examination of survey patients.

(1) The field workers with the help of village leaders recorded the individual identification data.

(2) Height and weight data were recorded.

(3) Clinical examinations of the hair, skin, eyes, lips, mouth, tongue, gums, teeth, skeletal defects and tendon reflexes were performed. The proforma used for recording the examination findings was the same as used in the previous survey (Rao and Rao, 1958).

(4) Each person was then completely re-examined by the senior physician assisted by one of the interns in rotation for accuracy and consistency of the earlier findings. When discrepancies were found, the original examiner was called for consultation.

(5) Venous blood specimens were taken at the time of physical examination from all participants whose consent for venipuncture could be obtained. Finger-tip blood was used for the haematological studies. Blood specimens were usually taken between 10 and 11 A.M.

C. LABORATORY INVESTIGATIONS:

(1) Clinical: The haematological methods were the same as those used previously (Rao and Rao, 1958).

(2) Biochemical: Total protein was determined by a biuret method (Kingsley, 1942), and albumin after precipitation with 22·5 per cent sodium sulphate. Vitamin A and carotene were estimated by the Carr-Price reaction (Kaser and Stekol, 1943; Kimble, 1939). Calcium in serum was determined by the method of Clark and Collip (1925). Serum iron was determined by the method of Ramsay (1953).

(3) Stool examinations were performed by the flotation method of Willis (1921).

D. DIETARY SURVEY:

A qualitative assessment of the food consumption of 111 families was made and also a quantitative study of food "as eaten" by 20 representative families over each of the four seasons of the year.

Results

A. MEDICAL HISTORY:

Of the 538 persons examined, only five gave a history of nightblindness. Soreness and burning of the tongue when curry and rice were eaten were mentioned by 27 persons. Excessive bleeding from small injuries and delayed healing of wounds were reported by 10 individuals. Pain in the chest was reported by 37 persons and difficulty in breathing by 11. Only 5 persons complained of frequent swelling of ankles. Indigestion was reported by 30 and abdominal distress by 31 persons.

B. PHYSICAL EXAMINATION:

The results of clinical examination in regard to the nutritional abnormalities observed are presented in Table 1 and are compared to the findings in Pennathur (Rao and Rao, 1958). In general,

TABLE I—SHOWING CLINICAL MANIFESTATIONS OF MALNUTRITION IN PENNATHUR AND SHOLAVARAM (PERCENTAGES)

Clinical manifestations	Sholavaram					Pennathur Total
	Adults		Children		Total	
	M	F	M	F		
Conjunctiva :						
Xerosis ...	20·2	19·8	24·8	21·4	21·4	17·0
Bitot's spots ...	5·8	8·6	8·3	5·6	7·1	4·7
Pigmentation ...	30·3	31·6	17·8	19·9	30·4	35·2
Discharge ...	7·2	0·7	7·4	5·6	5·1	5·6
Cornea :						
Xerosis ...	2·1	2·7	...	0·8	1·5	5·6
Vascularisation ...	1·4	0·7	...	0·8	0·8	2·2
Photophobia ...	...	...	...	0·8	0·2	...
Mouth :						
Lips—						
Cheilosis ...	1·4	4·6	5·8	4·8	4·1	...
Angular stomatitis, active ...	2·9	4·0	11·6	10·3	6·9	13·5
Angular stomatitis, healed ...	9·4	7·9	9·9	13·5	10·0	
Buccal mucosa—						
Stomatitis ...	2·2	3·3	1·7	0·8	2·0	2·8
Tongue—						
Glossitis ...	4·3	2·6	0·8	0·8	2·2	3·4
Hypertrophic papillae ...	1·4	0·7	0·8	0·8	0·9	
Atrophic papillae	5·0	4·6	9·1	6·3	6·1	...
Smooth ...	1·4	5·3	4·1	2·4	3·4	5·6
Fissured ...	4·3	2·0	0·8	...	1·9	
Gums :						
Hyperaemic, bleeding & swollen ...	9·4	11·8	2·5	5·6	7·6	9·3
Pyoorhoeic & retracted ...	20·6	19·1	0·8	0·8	12·6	23·9
Teeth :						
Fluorosis ...	25·9	26·3	5·8	7·1	17·1	28·8
Caries ...	20·9	25·7	9·1	3·2	15·4	28·6
Hair :						
Loss of lustre ...	2·9	11·2	9·1	12·0	8·7	13·5
Discoloured and dry	2·2	0·7	3·3	4·8	2·6	8·4
Sparse and brittle	2·9	...	1·7	2·4	1·7	1·8
Skin :						
Xerosis cutis ...	18·0	29·0	23·1	22·2	23·2	25·0
Folliculosis ...	1·4	2·6	4·1	3·2	2·8	
Follicular keratosis	2·2	0·7	0·8	...	0·9	
Phrynoderma ...	...	2·0	1·7	1·6	1·3	4·3
Diminished elasticity ...	13·0	13·8	6·6	2·4	9·3	11·2
Wrinkled ...	2·9	5·9	0·8	...	2·6	
Dissebacia ...	2·2	1·3	3·3	4·0	2·6	2·5
Abdomen :						
Liver, palpable ...	4·3	1·3	13·2	15·1	8·0	8·4
Spleen, palpable ...	0·7	1·3	1·7	0·8	1·1	0·9
Throat :						
Tonsils, enlarged	7·9	7·2	28·1	19·1	14·9	22·5
C.N.S. :						
Diminished ankle jerks ...	...	...	...	...	...	0·4

the clinical findings in the two villages were similar.

B. CLINICAL SIGNS :

Clinical signs commonly associated with nutritional deficiencies are given below :

1. *Vitamin A deficiency*—Observations were limited to gross conjunctival, corneal and dermal changes. Such of the observed changes which were of uncertain significance with reference to vitamin A deficiency were noted, but are not analysed here.

Under eye changes, 21·4 per cent of the persons examined showed xerosis of the conjunctiva, 7·1 per cent Bitot's spots and 1·5 per cent xerosis of the cornea ; a total of 29·9 per cent of 538 persons examined against 27·3 per cent in Pennathur.

Under skin changes, 23·2 per cent showed xerosis cutis, 5·0 per cent follicular changes and 11·9 per cent wrinkling and diminished elasticity ; a total of 40·1 per cent of all persons examined against 40·5 per cent in Pennathur survey.

2. *Riboflavin deficiency*—Manifestations observed were as follows : cheilosis 4·1 per cent (not recorded at Pennathur) ; buccal mucosa stomatitis 2·0 per cent (Pennathur 2·8 per cent) ; angular stomatitis, active 6·9 per cent and healed 10 per cent (Pennathur both active and healed, 13·5 per cent) ; tongue changes 11·4 per cent (Pennathur 5·6 per cent), dyssebacia 2·6 per cent (Pennathur 2·5 per cent) ; scleral vascularity 0·8 per cent (Pennathur 2·2 per cent), and lachrymation 5·1 per cent (Pennathur 5·6 per cent).

3. *Niacin deficiency*—Reddened tongue occurred in 1·5 per cent of the population examined. In 2·2 per cent, the tongue was found swollen with indentations along the edges. Hypertrophic papillae were recorded in 1·0 per cent. Symmetrical dermatitis with pigmentation associated with this deficiency was seen in 2·0 per cent and scrotal and pudendal dermatitis in 1·5 per cent. Reddened and swollen tongue together accounted for 4·0 per cent in the Pennathur survey. The skin lesions characteristic of niacin deficiency were not seen.

4. *Ascorbic acid deficiency*—Hyperaemic and bleeding gums occurred in 7·6 per cent of the total number of persons examined against 9·3 per cent in Pennathur. Characteristic skin manifestations such as petechial and purpuric lesions were not observed in either survey. 12·6 per cent of the persons examined had pyorrhea and retracted gums against 29·9 per cent in Pennathur.

5. *Thiamine deficiency*—No individual of the population sampled showed diminished ankle jerks, while in Pennathur diminished ankle jerk was recorded in 0·4 per cent cases.

6. *Protein deficiency*—The presence of pitting oedema was recorded as indicative of protein deficiency. Only seven or 1·3 per cent of the population examined showed this characteristic, compared with 2·3 per cent in Pennathur.

7. *Others*—(i) Teeth. Mottled enamel and carious teeth were prevalent. Of the 291 persons examined who were over 12 years of age, 76 or 26 per cent had fluorosis (Pennathur 38·2 per cent) and 68 or 23·4 per cent had dental caries (Pennathur 35·0 per cent). In boys and girls 12 years of age or younger, the incidence of mottled enamel was 6·5 per cent and dental caries only 6 per cent. Pennathur children, however, showed a higher incidence; mottled enamel 11·5 per cent and dental caries 16·25 per cent.

(ii) Liver and spleen—Of the 538 persons examined, the liver was palpable in 43 and the spleen in 6. Children 12 years of age and below showed a higher incidence of hepatomegaly than adults (16 boys or 13·2 per cent; 19 girls or 15·1 per cent; 6 men or 4·3 per cent and 2 women or 1·3 per cent). The corresponding figures for hepatomegaly in Pennathur were: boys 16·7 per cent; girls 18·9 per cent, men 5·7 per cent and women 1·4 per cent.

As in the pevious survey, the physicians performing the clinical examinations made an effort to find out medical diseases of a non-nutritional as well as nutritional nature.

C. LABORATORY DETERMINATIONS:

The range and the mean value of haemoglobin, packed cell volume (P.C.V.) and mean corpuscular haemoglobin concentration (M.C.H.C.) are shown in Table 2.

Comparable data from the Pennathur survey is summarised in Table 3. Statistical tests (t; $P<0.05$) were applied wherever necessary to test the significance of any difference observed between the mean values of the two surveys at Pennathur and Sholavaram.

1. *Haemoglobin*—Laboratory findings revealed a large number of low haemoglobin values. 24·6 per cent of the determinations were below 10g./100 ml., 38·1 per cent below 10·5 g./100 ml., and 49·7 per cent below 11 g./100 ml. of blood compared to 17, 31·6 and 39·8 per cent respectively in the Pennathur study (Rao and Rao, 1958; Rao, Rao and Baker, 1959).

Low haemoglobin concentrations were more common among children than among adults and also more common in female than in male subjects. The mean values obtained in this survey compare well with the results in the Pennathur survey.

2. *Packed cell volume*—Most of the values for men were between 40 and 50 per cent and for women between 35 and 45 per cent with means (±S. E.) of 42·64±0·46 and 36·70± 0·63 per cent respectively.

Although the mean values of P.C.V. seem somewhat high in the present study, the difference between the two surveys is not significant. Compared to the values recorded by other authors (Banerjee and Biswas, 1957; Gokhale and Pause, 1955), both the populations sampled showed a fairly high incidence of a mild degree of anaemia, correlating with the low haemoglobin levels.

3. *Mean corpuscular haemoglobin concentration*—The normal value for adults of either sex is usually taken as 34 per cent (Wintrobe, 1956). Most of the values for both men and women were

TABLE 2—SHOWING SUMMARY OF HAEMATOLOGICAL FINDINGS

Determination	Sex	No. examined	Range	Mean ± S.E.	Percentage of individuals below specified levels			
					<10	<10·5	<11	<12
Haemoglobin (g./100 ml.)	Boys ...	90	5·45—12·6	10·44±0·15	34·4	45·6	61·1	91·1
	Girls ...	96	5·2 —14·3	9·93±0·16	42·7	60·7	79·2	92·7
	Men ...	111	8·0 —15·6	12·57±0·15	3·6	11·7	18·0	33·3
	Women ...	126	3·7 —13·75	10·75±0·15	22·2	34·1	46·8	83·3
	All individuals	423	3·7 —15·6	10·98±0·09	24·6	38·1	49·7	74·0
					<30	<35	<40	<45
P.C.V. (%)	Men ...	73	32—52	42·64±0·48	0·0	2·7	27·4	67·1
	Women ...	81	17—45	36·70±0·63	8·6	29·6	71·6	98·8
	All individuals	154	17—52	39·51±0·47	4·5	16·9	50·6	83·8
					<26	<28	<30	<32
M.C.H.C. (%)	Men ...	73	23·3 —33·0	29·27±0·22	4·1	23·3	64·4	94·5
	Women ...	81	21·0 —37·1	29·07±0·31	7·4	25·9	69·1	88·9
	All individuals	154	21·0 —37·1	29·17±0·19	5·8	24·7	66·9	91·6

TABLE 3—SHOWING HAEMATOLOGICAL AND BIOLOGICAL FINDINGS (PENNATHUR)

Determination	Sex	No. examined	Range	Mean ± S.E.	Percentage of individuals below specified levels			
					<10	<10·5	<11	<12
Haemoglobin	Children ...	159	8·0 —14·0	10·37 ± 0·15	34·6	56·0	67·3	83·0
(g./100 ml.)	Males ...	236	5·8 —17·5	12·51 ± 0·12	5·1	9·3	13·1	37·7
	Females ...	201	5·1 —14·0	10·96 ± 0·11	17·0	38·4	49·3	80·6
	All individuals	500	5·1 —17·5	11·42 ± 0·08	17·0	31·6	39·8	64·4
					<30	<35	<40	<45
P.C.V. (%)	Males ...	238	20—50	40·3 ± 0·31	2·5	12·6	41·6	86·1
	Females ...	198	15—43	35·7 ± 0·29	6·1	38·4	89·9	100·0
	All individuals	436	15—50	38·2 ± 0·24	4·1	24·3	63·5	92·4
					<26	<28	<30	<32
M.C.H.C. (%)	Males ...	241	23·0 —40·7	30·57 ± 0·18	2·1	12·0	51·0	74·3
	Females ...	197	21·4 —40·3	30·49 ± 0·22	3·6	16·2	50·8	75·6
	All individuals	438	21·4 —40·7	30·53 ± 0·14	2·7	13·9	50·9	74·9
					<6·0	<6·2	<6·5	<7·0
Protein (g./100 ml.)	Males ...	243	4·22— 8·60	7·11 ± 0·05	4·1	6·2	10·5	41·2
	Females ...	193	5·67— 9·50	7·15 ± 0·05	3·1	4·1	13·5	36·8
	All individuals	436	4·22— 9·50	7·13 ± 0·03	3·7	5·3	15·2	39·3
					<3·0	<3·5	<4·0	<4·5
Albumin	Males ...	243	1·25— 5·71	4·28 ± 0·04	2·0	8·2	34·1	69·5
(g./100 ml.)	Females ...	193	2·23— 6·59	4·17 ± 0·04	3·1	10·3	39·3	70·4
	All individuals	436	1·25— 6·59	4·23 ± 0·03	2·5	9·1	36·4	69·9
					<10	<20	<30	<50
Vitamin A	Males ...	94	1·5 —37·5	15·6 ± 0·9	26·6	79·8	93·5	100·0
(mcg./100 ml.)	Females ...	63	1·5 —45·0	14·2 ± 1·1	38·2	81·0	93·7	100·0
	All individuals	157	1·5 —45·0	15·0 ± 0·7	31·2	80·2	93·5	100·0

TABLE 4—SHOWING ERYTHROCYTE CHANGES

Film	Boys		Girls		Men		Women		All individuals	
	No.	%	No.	%	No.	%	No.	%	No.	%
No. examined	90	100·0	96	100·0	111	100·0	126	100·0	423	100·0
Normal	1	1·1	...	...	...	...	...	...	1	0·2
Macrocytosis	1	1·1	3	3·1	...	...	1	0·8	5	1·2
Microcytosis	...	...	1	1·0	...	...	...	...	1	0·2
Polychromasia	56	62·2	70	72·9	18	16·2	57	45·2	201	47·5
Hypochromia, slight ...	43	47·8	38	39·6	81	73·0	67	53·2	229	54·1
Hypochromia, moderate ...	47	52·2	57	59·4	16	14·4	48	38·1	168	39·7
Anisocytosis	90	100·0	96	100·0	109	98·2	125	99·2	420	99·3
Poikilocytosis	39	43·3	38	39·6	37	33·3	47	37·3	161	38·1
Target cells	1	1·1	1	1·0	...	...	2	1·6	4	1·0

between 28 and 32 per cent with means (± S. E.) 29·27 ± 0·22 and 29·07 ± 0·31 per cent respectively.

Although the mean values of the M.C.H.C. seem somewhat low in the present study, there is apparently no significant difference between the two surveys. Here, as in Pennathur (Rao and Rao, 1958; Rao, Rao and Baker, 1959), half of the individuals studied had an M.C.H.C. below 30 per cent, indicating a significant degree of iron deficiency.

4. *Examination of blood films*—The erythrocyte changes observed in the blood smears of the persons examined are shown in Table 4.

Out of 433 blood smears examined, only one appeared normal and the other 432 showed abnormalities in the red cell morphology. Abnormal

TABLE 5—SHOWING BIOCHEMICAL DETERMINATIONS ON SERUM

Determination	Sex	No. examined	Range	Mean ± S.E.	Percentage of individuals below specified levels			
					<6·0	<6·2	<6·5	<7·0
Protein (g./100 ml.)	Males ...	111	5·0—8·5	6·95 ± 0·07	10·0	16·4	29·1	53·2
	Females ...	122	4·3—8·2	6·89 ± 0·07	11·6	17·4	24·0	55·7
	All individuals	233	4·3—8·5	6·92 ± 0·05	10·7	16·7	26·2	54·5
					<3·0	<3·5	<4·0	<4·5
Albumin	Males ...	111	2·7—6·0	4·05 ± 0·05	1·8	16·2	43·2	84·7
(g./100 ml.)	Females ...	122	2·0—5·0	3·96 ± 0·05	2·5	21·3	50·8	84·4
	All individuals	233	2·0—6·0	4·00 ± 0·04	2·1	18·9	47·2	84·5
					<10	<20	<30	<50
Vitamin A	Males ...	83	4·2—90·0	22·7 ± 1·7	12·1	53·0	85·5	95·2
(mcg./100 ml.)	Females ...	85	3·0—87·0	20·6 ± 1·3	12·9	56·5	88·2	97·6
	All individuals	168	3·0—90·0	21·6 ± 1·1	12·5	54·8	86·9	96·4
					<20	<40	<60	<100
Carotene	Males ...	84	4—260	44·11 ± 5·26	37·7	64·3	81·0	90·5
(mcg./100 ml.)	Females ...	85	4—170	43·12 ± 3·94	29·2	62·4	76·5	88·2
	All individuals	169	4—260	43·61 ± 3·27	32·0	63·2	78·7	89·3
					<9	<10	<11	<12
Calcium	Males ...	51	7·4—12·0	10·38 ± 0·7	19·6	45·1	66·7	72·5
(mg./100 ml.)	Females ...	57	7·2—12·0	10·01 ± 0·20	28·1	52·6	75·4	84·2
	All individuals	108	7·2—12·0	10·19 ± 0·15	24·1	49·1	71·3	78·7
					<40	<80	<120	<160
Iron	Males ...	79	8·0—220	102·41 ± 6·06	8·9	41·8	62·0	82·3
(mcg./100 ml.)	Females ...	96	6—194	79·17 ± 4·93	25·0	56·3	75·0	94·8
	All individuals	175	6—220	89·66 ± 3·94	17·7	49·7	69·1	89·1

changes in the Pennathur series were found in 81·5 per cent. In the Sholavaram series, it was exceptional to see normochromic blood cells.

The data showing the levels of protein, albumin, vitamin A, carotene, calcium, and iron in the serum are summarised in Table 5.

5. *Total proteins*—The total serum protein levels though lower than in our previous survey, were generally within the range considered normal ; 10·1 per cent of the subjects had values below 6 g./100 ml. and 16·7 per cent below 6·2 g./100 ml. compared to 3·7 and 5·3 per cent respectively in Pennathur. There was no significant difference in serum protein level between the sexes. These data correspond to our study in Pennathur (Rao, Rao and Klontz, 1959a) and also to the studies among normal Indians by other authors (Datta and Chakravartty, 1947 ; Satoskar and Lewis, 1954).

6. *Albumin*—The total albumin values were also lower in this survey than in Pennathur (Table 3). In 18·9 per cent of the entire group the albumin was less than 3·5 g./100 ml. and 47·1 per cent of all subjects had values less than 4 g./100 ml. Corresponding figures for Pennathur were 9·2 and 36·5 per cent respectively.

7. *Vitamin A*—There is little agreement on the desirable levels of vitamin A. However, values above 30 mcg. per cent are usually considered adequate. In any population group, a finding of 5 per cent of subjects with levels below 10 mcg. per cent or 15 per cent of subjects below 20 mcg. per cent suggests the probability of vitamin A deficiency (Committee, 1957). The study in Sholavaram revealed that 12·5 per cent of the population had levels of serum vitamin A below 10 mcg per cent (34 I.U.), 54·8 per cent below 20 mcg. per cent (67 I.U.) and 86·9 per cent below 30 mcg. per cent (100 I.U.). The mean values (±S. E.) for males and females were 22·7 ± 1·7 and 20·6 ± 1·3 mcg. per cent respectively with individual values ranging from 4 to 90 mcg. per cent for men and 3 to 87 mcg. per cent for women. Values above 30 mcg. per cent were rare and occurred in 6 out of 83 men and 5 out of 85 women. The findings of this study are similar though somewhat higher than those reported previously (Rao, Rao and Klontz, 1959b).

8. *Carotene*—Serum carotene levels below 20 mcg. per cent occurred in 32 per cent and below 40 mcg. per cent in 63 per cent of the 169 persons

tested. In the earlier study in Pennathur, serum carotene levels were not determined.

9. *Calcium*—Serum calcium was estimated for 51 men and 57 women. The mean value (±S. E.) was found to be 10·38 ± 0·23 mg./100 ml. for males and 10·11 ± 0·20 mg./100 ml. for females with individual observations ranging between 7·4 and 12·0 mg./100 ml. for men and 7·2 and 12·0 mg./100 ml. for women respectively. Nearly 19·6 per cent men and 28·1 per cent women had serum calcium levels below 9 g./100 ml. Calcium was not determined in the Pennathur survey.

10. *Iron*—The mean concentration of serum iron in this study was 102·41 mcg. per cent ± 53·55 (S. D.) for 79 men and 79·17 mcg. per cent ± 48·06 (S. D.) for 96 women with a range of 8 to 220 mcg./100 ml. and 6 to 194 mcg./100 ml. respectively. Nearly 29·1 per cent of the men and 45·8 per cent of the women had values less than 60 mcg./100 ml. Only 14 men and 5 women had values above 160 mcg./100 ml.

Sudarshan Gupta *et al* (1959) who determined plasma iron concentration in 100 normal individuals recorded the mean value in men as 123 mcg. per cent ± 27 and in women 108 mcg. per cent ± 15 with a range of 67–200 mcg./100 ml. and 70–133 mcg./100 ml. respectively.

11. *Intestinal parasitism*—The incidence of intestinal helminths among 342 of the population group examined by single specimen, amounted to 75·2 per cent against 78·8 per cent in Pennathur. The frequency of ascaris lumbricoides was 7·31 per cent; trichocephales dispar 1·46 per cent; hookworm 38·01 per cent (Pennathur 41 per cent); E. coli 16·08 per cent; giardia lamblia 8·77 per cent and others (I.B. cyst, H. nana ova and pin worm) 12 per cent.

Discussion

Three aspects of the results will be discussed: (1) the relatively high incidence and degree of deficiency as indicated by blood levels, (2) the relatively low incidence of signs of deficiencies, and (3) the lack of correlation between various indices of nutrition.

Compared to the findings in Newfoundland (Adamson *et al*, 1945; Aykroyd *et al*, 1949), Formosa (Jolliffe and Cheng Tung, 1956) and Cuba (Jolliffe *et al*, 1956), where a good correlation of the clinical signs with the biochemical findings was established, the results in our surveys in Pennathur in 1956 and the present work in Sholavaram showed a relative lack of such correlation. The incidence of skin manifestation was low in both our surveys and does not support the value of skin changes in the clinical assessment of nutritional deficiencies in this population.

Vitamin A—Relatively severe deficiency is indicated by the vitamin A and carotene levels in blood; but the incidence of clinical signs of this deficiency (skin manifestations, particularly) is low. This is similar to our earlier findings in Pennathur.

The biochemical indices of vitamin A nutrition are consistent with the existence of a prior or long continued low intake of foods containing this vitamin. The fact that these families had a low fat intake may have contributed to inefficient utilisation of the vitamin A and carotene in their food.

Riboflavin—The incidence of symptoms of riboflavin deficiency was relatively low in spite of a low dietary intake of this vitamin. Unfortunately, we have no chemical data on riboflavin.

French *et al* (1959) in their nutrition survey of the Armed Forces of Pakistan also found no apparent correlation of the physical signs of riboflavin deficiency with the dietary intake.

In general, the data documented indicate inadequate nutrition with regard to protein, iron, vitamin A and riboflavin.

In the published articles on the Pennathur survey, recommendations for combating the deficiencies were made (Rao *et al*, 1959a, b) and Rao *et al* (1959). Numerous problems, require further study: (1) Developing low cost protein-rich foods such as multi-purpose food (Subramanyan *et al*, 1956) or the Coonoor product (Venkatachalam *et al*, 1954) for use as supplements to the customary diet of the villager and measures for popularising their use. (2) Planning and instituting methods of increasing the amount and seasonal constancy of vitamin A and C in the diet, preferably through the use of locally available products such as green edible leaves (curry and drumstick) and the fruits of papaya, citrus, guava, mango and amla plants. (3) Increasing the amount of riboflavin in the diet perhaps by the use of milk, *dal* and groundnuts. (4) Investigating measures for combating the iron deficiency anaemia prevalent in the population; and (5) studies among school children showing a higher than average incidence of clinical signs of nutritional deficiencies before and after appropriate therapy of dietary improvement.

Summary

1. A comprehensive nutrition survey of a rural population of 538 persons in 103 families was carried out in the south Indian village of Sholavaram by methods similar to those used previously in Pennathur.

2. A census was taken of the village, which was then divided into blocks and a one-way stratified samples of families chosen by random numbers with a uniform sampling fraction of one fifth.

3. Serious nutritional deficiency states were recorded during the physical examination of the subjects. Of high incidence were the following conditions which are traditionally associated with nutritional deficiencies: (a) poor musculature, (b) xerosis conjunctiva with Bitot's spots, (c) xerosis cutis, (d) angular stomatitis, (e) papillary hypertrophy or atrophy, (f) anaemia, (g) caries, and (h) fluorosis.

4. Laboratory examinations showed that blood levels of many subjects were low for vitamin A and carotene, serum albumin, iron, haemoglobin, packed cell volume and mean corpuscular haemoglobin concentration.

5. No good correlation could be established between the clinical and biochemical findings.

6. The results of Sholavaram survey have in general confirmed the earlier findings of Pennathur study in regard to the clinical and biochemical measurements. In Sholavaram, as in Pennathur, the skin manifestations did not lead to an accurate assessment of nutritional deficiencies.

7. Preventive measures and problems requiring further study are discussed.

ACKNOWLEDGMENTS

This study was undertaken with the generous co-operation and assistance of many organisations and individuals. We are particularly indebted to Dr. John S. Carman, Director, and to Dr. Jacob Chandy, Medical Superintendent for their support and interest. Our thanks are due to Dr. K. G. Koshi, Head of the Department of Preventive and Social Medicine, for his interest in the work and for the use of the facilities of the Rural Hospital and to the medical interns and public health nurses who assisted with the examinations of the subjects.

We are indebted also to Dr. S. J. Baker for supervising the haematological work and to Dr. B. K. Bachhawat for directing the biochemical studies. Miss Sulochana Rao assisted us with the statistical work and Mr. P. S. Srinivasan served as Secretary for the project.

The President of the Sholavaram Panchayat Board, Sri Kanniah Reddiar, and other village leaders played an essential part in making this survey possible. The village field workers, Sri David Pillai and Srimathi Kannammal, contributed greatly to the success of the village work.

We wish to express our thanks to Dr. A. Sreenivasan, Deputy Director, Central Food Technological Research Institute, Mysore, for his advice and encouragement throughout the study.

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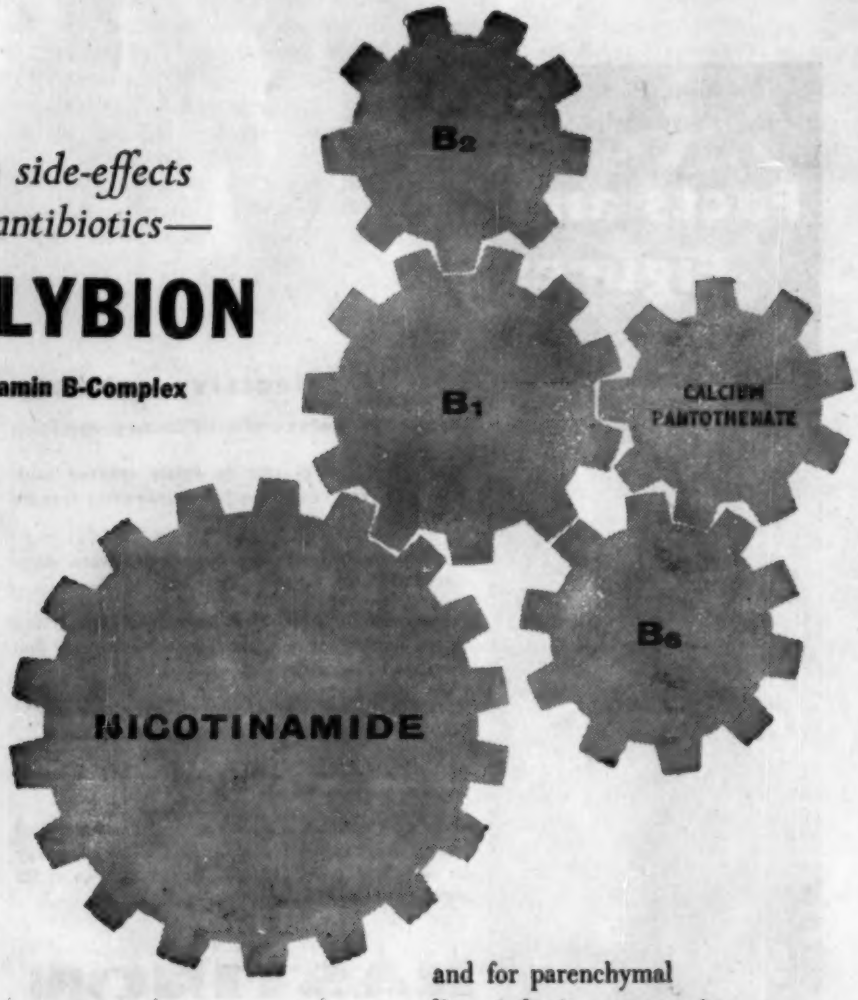

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COARCTATION OF THE AORTA
With Hypertelorism, Pilonidal Sinus and Polydactyly

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Coarctation of the aorta, first reported by Paris n 1791 is not uncommon. According to Abbott (1928) it ranks third and according to Nadas (1957) 5th in the order of incidence of common cardiac anomalies in congenital diseases of the heart. It is also associated with other congenital anomalies. The following case had features of coarctation of the aorta with hypertelorism, pilonidal sinus and polydactyly, a combination of infrequent occurrence.

Case Report

Subhash, a male child aged 5, was admitted with complaints of irregular fever and dry cough of two months' duration. The milestones had been all normal but the child was underweight and undersized for his age. From early childhood, he used to suffer from fainting fits.

Family history was not contributory.

The mother had an uncomplicated pregnancy and normal delivery.

Physical examination revealed an ill-looking, poor built and undernourished child. The temperature was 101°F. There was mild anaemia and the fingers showed clubbing. The radial pulse was 110 per minute, regular and equal on both sides. The femoral pulsations were absent. The blood pressure was 120/80 mm. Hg in the upper extremities and unrecordable in the lower extremities. The praecordium was bulging and the apex beat was in the fifth intercostal space 1 cm. outside the midclavicular line. A loud systolic murmur was heard in the precordium, and was best audible in the left parasternal region. The liver and the spleen were each palpable one finger below the costal margins. The left hand had six fingers. A pilonidal sinus was present. The child presented typical appearance of hypertelorism, the eyes being set wide apart with apparent depression of the bridge of the nose.

The investigations revealed red cells, 3·2 mill./c.mm. ; Hb., 9·5 g. per cent, total leucocyte count 10,500/c.mm. with 80 per cent polymorphs and 20 per cent lymphocytes. Urine showed presence of a few red blood cells. Erythrocyte sedimentation rate was 35 mm./1 hour (Westergren). Blood urea was 22 mg. per cent. Blood culture for streptococcus viridans was negative. A skiagram of the heart revealed increase in the transverse diameter of the heart with flattening of the left border ; no notching of ribs was seen. The electrocardiogram showed evidence of left ventricular strain.

The patient was put on penicillin, 2,000,000 units daily. The temperature came down to normal after 4 days of treatment. The patient left hospital against medical advice, and was reported to have died suddenly, a month later.

Comments

The child showed typical features of coarctation of the aorta, viz., absent femoral pulsation, unrecordable blood pressure in the lower limbs, systolic murmur in the parasternal region, left ventricular strain on electrocardiography, with subacute bacterial endocarditis. The notching of the ribs was, however, seen on skiagraphy. It is well recognised that the incidence of detectable rib notching increases with age, and in general it is only above the age of 20 that rib notching is found in a great majority of the patients (Cooley and Sloan, 1956).

Hypertelorism was first described by Greig (1924) and has since been mentioned in association with a variety of clinical conditions. It is inherited as a Mendelian dominant and is characterised by wide separation of eyes due to gross over-development of the lesser wing of the sphenoid. It is usually associated with mental defect though not invariably so. Kerwood *et al* (1954) point out that unless accurate measurements of interpupillary distance and head breadth are made an erroneous impression of hypertelorism may be gained owing to the flattening of the bridge of the nose.

A pilonidal sinus is a congenital stratified squamous epithelium-lined sinus, with or without cystic formation, occurring in the soft tissues overlying the site of sacrococcygeal hiatus.

Summary

The association of coarctation of aorta with other congenital anomalies, like hypertelorism, pilonidal sinus and polydactyly, is an interesting feature in this case. This association has not been reported before.

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ANOMALOUS LONG FLEXORS OF THE FOOT

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During the class dissections in the anatomy department of M.G.M. Medical College, Indore, the undermentioned features were recorded in the right foot of the cadaver of an adult :

Flexor digitorum longus and flexor hallucis longus muscles in the leg were normal.

Flexor digitorum longus ended in the middle of the sole of the foot by dividing into three tendons, one each for second, third and the fourth toes. The tendon for the little toe was missing.

Flexor digitorum accessorium showed an abnormally massive medial head. Besides the usual insertion, the muscle ended in a long slender tendon, which had relations similar to flexor digitorum longus tendon for the little toe and was inserted into the base of the distal phalanx of the little toe. No lumbrical muscle was attached to this tendon.

FIG. 1—SHOWING ABNORMALITIES IN THE FLEXOR DIGITORUM LONGUS, FLEXOR DIGITORUM ACCESSORIUS AND LUMBRICALES AS MENTIONED IN THE TEXT

Four lumbrical muscles were seen arising from the three flexor digitorum longus tendons. Out of these, the second and third were bicipital. The fourth lumbrical took origin from the lateral side of the flexor digitorum longus tendon of IV toe. All the four lumbricals had the usual insertion.

Flexor digitorum brevis had usual attachments but ended in three tendons only, namely for II, III and IV toes. The tendon for V toe was very slender and divorced from the main mass. It took origin from the superficial transverse ligament of the sole of the foot in the interval between heads of IV and V metatarsal bones, and was inserted in the usual way, i.e., splitting into two slips, the long flexor tendon passing through the gap (Fig. 1).

The nerve supply of these muscles did not show any abnormality.

COMMENTS

Jones (1941) in his excellent monograph on the anatomy of the foot has rightly stressed the importance of the movements in walking. He has postulated that flexors contract to pull the toes against the ground while walking and simultaneously the extensors pull the leg over the ankle. If these movements were to take place by the action of extrinsic muscles alone, flexors and extensors would neutralise each other. This mechanical disadvantage is counteracted by passing over the flexor action to an intrinsic muscle in the foot, the flexor digitorum accessorius. The ingenuity of this device lies in providing an additional contractile belly to the flexor digitorum longus.

Flexor digitorum accessorius in man is said to be a distinct human specialisation by virtue of its tibial head which is not present in most of the primates. It acts as an intrinsic muscle to stabilise the action of long flexor tendons, thereby liberating the crural part of flexor digitorum longus from the part of fixing the toes to the ground. As far as its usually ascribed function of correcting the pull of flexor digitorum longus tendon is concerned, it can be said that the little toe tendon is in maximum need of that and the flexor digitorum accessorius and the fibrous flexor sheaths fully serve this function.

The flexor digitorum accessorius in man thus serves two functions, namely,

1. By intrinsicalisation of flexors, it liberates the crural part of flexor digitorum longus from the function of fixing the toes to the ground.

2. It corrects the direction of pull of flexor digitorum longus tendons, especially that of the little toe.

Barlow (1949, 1953) reported a series of four cases where the long flexors were intrinsicalised to varying degrees. In these cases the degree of replacement of flexor digitorum longus by flexor digitorum accessorius varies from one-and-a-half tendon to all the four tendons.

In this case, the functional adaptation has progressed beyond the normal limits. Flexor digitorum accessorius has completely intrinsicalised the little toe which is in maximum need of it. In addition, it has got the flexor digitorum brevis tendon for the little toe separated from the main muscle body and has migrated distally.

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JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION
CALCUTTA, SEPTEMBER 16, 1960

HYGIENE AND SANITATION IN AIRPORTS

'Aviation Hygiene and Sanitation' is the subject of an extensive review which appeared in a recent issue of the *WHO Chronicle*[1]. We find that attempts to prevent the international spread of disease have quite a long history.

In the 19th century many international sanitary conventions were agreed upon. The constitution of the World Health Organisation provides provision for adopting regulations regarding sanitary and quarantine requirements and lays down procedures for this purpose. Accordingly International Sanitary Regulations were drafted and adopted by the 4th World Health Assembly in 1951. The purpose of these regulations was to ensure "the maximum security against the international spread of diseases with the minimum interference with world traffic". The regulations covered against six quarantinable diseases, viz., plague, cholera, yellow fever, smallpox, typhus, and relapsing fever.

The International Sanitary Regulations enjoin upon the member States of the WHO to make suitable provision that airports in their territories should have adequate organisation and equipment for the application of the provisions of the Regulations. The airports must be supplied with pure drinking water and must provide effective measures for the removal and safe disposal of excrement, refuse, waste water, condemned food and other matter considered dangerous to the health in the airport area. Sanitary airports must also possess a medical service capable of combating infection.

The 4th World Health Assembly enunciated the principle that the health of the air-crews should be protected in all airports *en route*. This meant that besides the six diseases mentioned above, the airport authorities should ensure protection against attacks of other diseases, viz., dysentery, food poisoning, gastro-enteritis, and malaria. Thus a high standard of hygiene and sanitation must be ensured. For this purpose the WHO Expert Committee on Hygiene and Sanitation in Aviation has prepared and published an illustrated Guide (1960). The phenomenal growth in the number of passengers carried by air on scheduled services throughout the world (from 2½ million in 1937 to 90 million in 1957) has put a severe strain on health, airport facilities and personnel. The "Guide" contains specific recommendations on water, food and wastes.

All water for drinking and other personal use by the crews and passengers, whether in the air or on the ground should be free from chemical substances and micro-organisms that might cause illness in any form. It should be safe, attractive and must be lacking in colour, turbidity and disagreeable taste or odour. It should also conform to acceptable hygiene standards. If necessary it should be given precautionary disinfection, and samples should be examined weekly by airport health authorities. If, however, the supply of water is of an inferior or unknown quality, it should receive suitable treatment for destruction of cysts of *Entamoeba histolytica* and the virus of infectious hepatitis. Methods recommended include boiling (when below 10,000 ft. height), chlorination (from 0·3 to 10 parts per million of residual chlorine) and filtration. Water reservoirs and distributing pipes should be kept clean.

All food should be of good sanitary quality, well preserved and kept scrupulously clean. All meat and fish should be thoroughly cooked before serving. In tropical countries raw foods, e.g., green salads and chopped raw vegetables, should be avoided. All food should be well handled and protected from contamination. Vessels containing elements like cadmium and lead should be avoided. There are special hazards with food like cream, milk, milk products, cracked eggs, raw oysters, shell fish, gravies, meat salads and dressings.

Food handlers should not include "carriers", or persons who are in the incubation period of an infection or sufferers from gastro-intestinal or other infective diseases. Spitting and use of tobacco in any form should be prohibited. Food handlers must keep their hands and nails clean, wear clean garments, and minimise the risk of contamination. The kitchen and the store as also dishes and utensils should be kept hygienically clean.

Toilet wastes, sewage, air-sickness containers and refuse at airports and on aircraft should be handled and disposed of in the most sanitary manner. Spillage and open exposures should be avoided and garbage properly treated. Watertight receptacles, easily cleanable floorings, soil cans, tanks and wash-basins should be provided on aircraft.

The rooms used by aircrews and passengers in transit should be mosquito-proofed. Sleeping quarters should be sprayed with residual insecticides. Active anti-mosquito measures and control of rats at international airports are important.

Only an adequate strength of trained ground personnel with equipment and premises can provide the minimum sanitary standard necessary for maintaining an international airport.

[1] *WHO Chronicle*, 14 : 219, 1960.

GENERAL PRACTICE DIGEST

TREATMENT OF LEUKAEMIA

The management of leukaemia includes specific and non-specific therapy. The latter is directed towards secondary complications of the disease, which are common to all types of leukaemia.

NON-SPECIFIC THERAPY :

1. *Infection*—Infections of mucous membranes, respiratory tract and urinary tract which are quite common are treated with appropriate chemotherapy. The organisms are generally of low pathogenicity, and yeast infections are common.

2. *Anaemia*—This generally responds to specific treatment. Where it proves refractory, blood transfusions are indicated. Sometimes striking remissions may follow a transfusion.

In the absence of haemorrhage, iron is of no value in the treatment of anaemia. In rare cases where megaloblastic anaemia accompanies the leukaemic process, the anaemia responds to folic acid.

3. *Haemorrhage*—This is often a sequel to thrombocytopenia, which is usually a terminal event. As it is a signal of the terminal phase of the disease no energetic treatment is advisable. Platelet transfusion, may however, be useful to combat severe thrombocytopoenic bleeding early in the disease when remissions may occur.

SPECIFIC THERAPY :

The main therapeutic agents in current use include (1) Nitrogen mustard derivatives—HN_1, HN_2, chlorambucil and bisulphan; (2) Antimetabolites—6-mercaptopurine and amethopterine; (3) Steroids—prednisone and triamcymatone, and (4) Irradiation—x-rays, P_{32}

Although good response to a drug may occur initially, resistance to it is a common sequel.

ACUTE LEUKAEMIAS

It is difficult to categorise acute leukaemia into lymphoblastic or myeloblastic type—the predominant cell is a primitive non-maturing form. The course of the disease is uniformly fatal in about 2 years. Occurrence of remission and comfort of the patient can be achieved by treatment.

In children the chances of inducing remission are much greater than in adults and three drugs are of value :

(1) *6-mercaptopurine*—By its use remission can often be obtained in acute leukaemia, in dosage of 2·5 mg./kg. body weight. Its effect on white cell count materialises in 3 to 4 weeks. When the W.B.C. count starts to fall the dose of the drug should be reduced and maintenance on about 0·5 to 1·0 mg./kg. body weight can be recommended.

(2) *Folic acid antagonists*—Amethopterine is most commonly used. The dose of the drug in children is usually 0·25 mg./kg. daily. Its effect begins after 2 to 3 weeks. As soon as the W.B.C. count falls the drug should be withdrawn, as oral and gastro-intestinal ulceration are common complications.

(3) *Steroids*—They are likely to be most effective when the leukaemic process is attempting to differentiate along lymphatic lanes. Even if the effect on the leukaemic process is negligible, these drugs may leave a valuable effect in increasing the life span of the red cell when it is reduced or in stimulating the activity of erythropoiesis in the bone marrow.

Large doses of steroids may have to be given. There is probably little to be gained by using ACTH or cortisone. Prednisone, the drug of choice, should be given in daily doses of at least 1 gm./kg. body weight. In resistant cases, the dosage may be increased to 3 mg./kg. body weight. Above this range little further effect is achieved. Beneficial effects of steroids are usually apparent in 2 weeks, when the dose can be reduced.

In adults with acute leukaemia the most effective drugs are 6-mercaptopurine and steroids. Amethopterine have little effect.

Irradiation is of no value and is actively detrimental in the treatment of acute leukaemia.

CHRONIC LEUKAEMIAS

(A) MYELOID LEUKAEMIA :

1. *Nitrogen mustards*—Bisulphan, a potent marrow poison, should be used with caution. Doses of 0·1 mg./kg. body weight (or 4 to 6 mg./kg. in adult man) produce a fall in white cell count normally within 3 to 4 weeks, and this effect can be well maintained by reducing the daily dose to 1 to 2 mg. for many months. Anaemia and thrombocytopenia may improve with a fall in the peripheral white cell count.

2. *Steroids*—These drugs are of little value in the treatment of myeloid leukaemia. If anaemia and thrombocytopoenia prove troublesome, steroids may be combined with bisulphan.

3. *Radiotherapy*—This is a "standby" in the treatment of chronic myeloid leukaemia. Irradiation may be given in the form of x-rays or injected P^{32}. X-rays may be given locally to the spleen or to areas of the body over marrow sites.

Splenomegaly usually diminishes with any therapy which is effective in lowering the white cell count and with clinical improvement.

The most common practice is to use bisulphan in this disease, with resort to radiotherapy if the disease becomes resistant or splenomegaly uncomfortable.

Even with modern treatment the prognosis of myeloid leukaemia is poor. About 50 per cent of patients only survive 2¼ years, and survival after 5 years is exceptional. Termination is often seen in a phase of acute leukaemia.

(B) LYMPHATIC LEUKAEMIA :

Chronic lymphatic leukaemia is a disease of older age groups, and many cases require no treatment, and the patient may survive many years. There is no point in treating a patient without symptoms. The onset of complications or the presence of glandular enlargement

requires treatment. The following methods of treatment are of value :

1. *Steroids*—Many cases of lymphatic leukaemia are sensitive to adequate doses of steroids, which may also have dramatic effect on complications like anaemia and thrombocytopenia. Glandular swellings may also decrease, but not completely.

Initially prednisone has to be given in dosage of 60 to 200 mg. daily. After initial improvement, a maintenance dose of not less than 15 mg. daily is effective.

2. *Nitrogen mustards*—These drugs are generally useful in lymphatic leukaemia. Both oral or intravenous preparations are useful when the glandular swelling is diffuse. An effective dose of chlorambucil is 0·1 mg./kg. body weight.

As these drugs are potent marrow poisons, the white cell count should be watched carefully during their use. Intravenous nitrogen mustards such as HN_2 and HN_1 may be effective when oral preparations are not. They should be given in doses of 0·1 to 0·2 mg./kg. body weight in repeated doses until leukopaenia starts to occur. Some physicians give large doses, such as 20 mg. in one infusion. Vomiting and local thrombophlebitis are common immediate complications of these drugs. TEM (Triethylene melamine) is too toxic for general use.

3. *Radiotherapy*—The main indication is the treatment of glandular swelling in this disease. Radiotherapy, nitrogen mustards and steriods are often combined usefully.

Splenectomy—This needs consideration in chronic leukaemias when the spleen is enlarged with associated haemolytic anaemia. It should not be resorted to without careful consideration. It is preferable to use isotope labelled red cells to assess whether the spleen is an important site of red cell destruction.

Marrow transfusion—It seems unlikely that such drastic procedures of lethal doses of irradiation (about 800 *r*) followed by transfusion of marrow, are justified for producing only a remission in the disease—an effect which can be produced by drugs.

From an article by T. A. J. Prankerd—*Brit. J. Clin. Pract.*, **14** : 101, 1960.

CURRENT MEDICAL LITERATURE

Gastro-intestinal Bleeding in Hereditary Haemorrhagic Telangiectasia

ECKER, J. A., DOANE, W. A., DICKSON, D. R., GEBHART, W. F. AND HARDHAM, J. (*Am. J. Gastroenterol.*, **33** : 411, 1960) from the Departments of Internal Medicine and Surgery, Santa Barbara Medical Clinic and Department of Pathology, Santa Barbara Cottage Hospital, Santa Barbara, Calif. in giving a review of the literature and in reporting a case with massive recurrent haemorrhage necessitating right colectomy observe :

Period before right colectomy stopped her bleeding dramatically. Our second patient, asymptomatic with no family history of bleeding, demonstrated involvement of the small bowel and face.

This entity is usually overlooked in gastrointestinal haemorrhage, 'hindsight being better than foresight' all too often.

There is a need for careful differential diagnosis in gastrointestinal bleeders with or without a family or hereditary history of haemorrhagic telangiectasia.

A review of published cases shows that gastroscopy, proctoscopy or laparotomy may be necessary to prove the diagnosis.

The purpose of our report is to alert the clinician to consider hereditary haemorrhagic telangiectasia in all cases of unexplained gastrointestinal bleeding and to examine the skin and mucous membranes most carefully.

Clinical Evaluation of the Gastro-intestinal Tract in the Aged

COHEN, T. AND GITMAN, L. (*Am. J. Gastroenterol.*, **33** : 422, 1960) from the Department of Internal Medicine, Brooklyn Hebrew Home and Hospital for the Aged, Brooklyn, N.Y. give in the following lines the summary of their observations :

The general impression that the older individual has numerous complaints referable to the gastrointestinal tract (with the exception of constipation and altered taste) is not confirmed.

In the 102 patients examined, there were radiographic findings in 45 per cent of patients. Of the 64 cases who completed 3 radiographic studies, 29·7 per cent had complaints (except for constipation and altered taste) referable to the gastro-intestinal tract, usually of a mild nature. Yet 78·1 per cent of these 64 patients had positive radiographic findings.

In general there is some, but not a striking increase in abnormalities as the patient grows older. Gallbladder disease, hiatus hernia, colonic diverticula, inguinal hernia, and external hemorrhoids are the prevalent findings in this group. The latter four conditions imply a relationship to degenerative changes associated with aging.

The incidence of gallstones noted in this series is lower than that generally reported for this age group.

Occult carcinoma was found in only 1 out of 260 radiographic procedures.

Haemodynamic Patterns in Chronic Cardiac Failure

SELZER, A. AND MCGAUGHEY, D. J. (*Am. J. Med.*, **28** : 337, 1960) from the Medical Service, V. A. Hospital and the Department of Medicine, Stanford University School of Medicine, San Francisco, California, from an analysis of the study of a group of fifty patients with chronic left-sided cardiac lesions (hypertensive, arteriosclerotic cardiac disease, aortic valve lesions and myocarditis) who entered the hospital in overt cardiac failure. All the patients were given conventional treatment for cardiac failure, and observed clinically until "dry" weight was attained and they were rendered asymptomatic at rest. Four-fifths of the patients then showed no clinical evidence of cardiac failure and many were able to resume normal activities.

At this point cardiac catheterisation studies were performed for the purpose of assessing chronic residual haemodynamic changes in patients who recovered from cardiac failure. Only one patient showed entirely normal circulatory dynamics. Forty-nine patients fell into one or another of the following haemodynamic groups: (1) normal resting dynamics with abnormal response to exercise; (2) normal resting left atrial pressure with an abnormally low resting cardiac output; (3) elevated left atrial pressure with a normal resting cardiac output; (4) elevated left atrial pressure with increase in pulmonary vascular resistance and low cardiac output. Nine patients in the last category were found to have marked pulmonary hypertension with a pulmonary vascular resistance more than 600 dynes/second/cm^{-5}.

The findings of this study are interpreted as showing qualitative differences in the adaptation of the circulation to chronic left ventricular overload. In those cases in which normal circulatory dynamics can no longer be re-established, the heart can adapt itself (1) by maintaining an abnormally low cardiac output and a normal or near normal left ventricular filling pressure; and (2) by preserving a normal cardiac output at the expense of continued increase of left ventricular filling and left atrial pressures. The latter group of cases represents chronic left ventricular failure and is analogous to mitral stenosis in that a stimulus is provided for the frequent development of increased pulmonary vascular resistance, with its restricting influence upon cardiac output. The clinical implications of these findings are discussed.

Senile Cardiac Amyloidosis

BUERGER, L. AND BRAUNSTEIN, H. (*Am. J. Med.*, **28**: 357, 1960) from the Department of Pathology, College of Medicine, University of Cincinnati and the Cincinnati General Hospital, Cincinnati, Ohio, write:

Senile cardiac amyloidosis represents a distinct variety of amyloidosis, which occurs in aged persons of both sexes, and in white and Negro subjects with equal frequency, and is restricted largely to the cardiovascular system; the incidence increases with increasing age but deposition does not appear to be cumulative. Cardiomegaly is not a prominent feature of the disorder but cardiac failure may occur when amyloid is deposited in large quantities.

The study revealed neither characteristic symptoms nor specific diagnostic methods by means of which a definite clinical diagnosis may be established. The high incidence of this disease in aged persons should suggest the diagnosis in all elderly patients with cardiac failure not explainable on the basis of other lesions.

A review of the pathologic findings noted at necropsy failed to reveal any specific aetiologic factors. An apparent increase in incidence in recent years in our material was restricted to subjects in the tenth decade.

Initial Myocardial Infarction Among 503 Veterans

BEARD, O. W., HIPP, H. R., ROBINS, M., TAYLOR, J. S., EBERT, R. V. AND BERAN, L. G. (*Am. J. Med.*, **28**: 671, 1960) from the Departments of Medicine, Veterans Administration Hospital and University of Arkansas Medical Centre, Little Rock, Arkansas, and the Reports and Statistics Service of the Veterans Administration, Washington, D.C. from an analysis and follow-up of 503 cases of initial myocardial infarction in veterans observe:

Advanced age of the patient, a history of hypertension, a definite history of angina pectoris, thromboembolic complications, shock, congestive failure, serious arrhythmias, high prolonged fever and marked leukocytosis were found to have an adverse effect upon the immediate mortality rate.

Except for atrioventricular block, marked leukocytosis, shock and thromboembolic complications, the same factors had an adverse effect upon the five-year mortality rate of recovered patients.

The marked variation in immediate mortality rates reported in various studies is discussed.

There is a remarkable agreement in long term mortality rates of survivors reported in recent studies.

In this study the mortality rate stabilised at about 4 per cent per annum for patients under fifty years of age who survived to the first anniversary of their attack. The mortality rate stabilised at about 9 per cent per annum for patients over fifty years of age who lived to the seventh month following onset of their first transmural myocardial infarction.

The excess mortality rate per annum observed in recovered patients varied from 3·4 per cent for patients thirty to thirty-nine years of age, to 5·2 per cent for patients fifty to fifty-nine years of age.

Electrolyte Regulation in Heart Disease

NEWMAN, E. V. (*J.A.M.A.*, **172**: 2046, 1960) from the School of Medicine, Vanderbilt University, Nashville, Tenn., in dealing with electrolyte regulation in the management of heart disease observes:

Congestive cardiac failure is primarily a disease of the hydraulic or circulatory system and secondarily a disease of metabolic derangement. It seems reasonable to direct therapy as much as possible to the primary system and not, if at all possible, to place disproportionate emphasis on treatment of the secondary metabolic manifestations. On the other hand, it is not entirely possible to separate hydraulic and metabolic events, because, while the hydraulic initiate the metabolic, the metabolic in turn worsen the hydraulic. Accumulation of sodium and water increases vascular congestion, heightens venous pressure, and adds to cardiac dilatation and respiratory distress. Under these circumstances, vigorous diuretic therapy directed to the secondary manifestation of sodium retention may ameliorate primary hydraulic abnormalities. The purpose of all measures directed to regulation of electrolyte levels is to maintain the best degree of cardiac competence and circulation. Failure of diuresis or "resistance" to diuretic drugs is really a problem of intractable or irreversible cardiac failure. Some deranging complications of diuretic therapy are due to unrelieved or severe manifestations of the primary hydraulic cause, which is malfunction of the heart.

The metabolic lesions of congestive failure are sodium retention, potassium loss, water retention, abnormal thirst, and abnormal concentrations of electrolytes in tissue cells as well as extracellular fluid. Some of the therapeutic measures and diuretic drugs may worsen some of the lesions (potassium loss and hyponatraemia) while correcting others (sodium retention and oedema). The recently discovered spirolactones, which specifically block the action of aldosterone on renal sodium retention and potassium loss, in the future may be valuable diagnostic and therapeutic adjuncts in the management of oedematous patients.

Irritable Colon and Gallbladder Disease

HEFFERNON, E. W., MILLHON, W. A. AND ROSEN, S. W. (*J.A.M.A.*, **173**: 1, 1960) from the Department of Gastroenterology, the Lahey Clinic, Boston, write:

In an effort to determine the relation between demonstrable disease of the biliary tract and persistent symptoms of colonic dysfunction, the records of 300 patients were reviewed. The group consisted of 294 patients in whom gallbladder disease was found at operation and 6 in whom it was demonstrated at autopsy. The predominant symptom was abdominal pain. It was located in the right upper quadrant in 81, radiated to the back in 25, and extended to the right shoulder in 10. It was true biliary colic in only 156 cases. Thirteen patients were asymptomatic. There were 140 patients with multiple gastrointestinal symptoms characteristic of irritable colon. The evidence is interpreted to mean that the postcholecystectomy syndrome and related disorders are frequently part of the irritable colon problem and that good results cannot be expected from surgery unless it is supplemented by dietary measures.

Hodgkin's Disease with Involvement of the Heart and Pericardium

JAKOB, H. G. AND ZIRKIN, R. M. (*J.A.M.A.*, **173**: 338, 1960) from Mount Sinai Hospital, Cleveland, write:

The heart was found to be involved in 3 of 15 cases of Hodgkin's disease. In one patient, a 46-year-old man, the myocardium showed a striking degree of fibrosis, with nodules of cells exhibiting extreme pleomorphism and a tumor mass protruding into the cavity of the right atrium. In the second patient, a 68-year-old woman, an infiltrate of lymphocytes, macrophages, and Reed-Sternberg cells was found in both myocardium and epicardium. In the third patient, a 50-year-old man, two nodules on the epicardial surface revealed massive infiltration of the subepicardial tissue with large pleomorphic cells, multinucleated giant cells, typical Reed-Sternberg cells, and nests of lymphocytes. In each case the history contained some evidence of cardiac disturbance. Unexplained arrhythmias and decompensation refractory to the usual treatment are two common manifestations of myocardial metastases.

Steroid-induced Adrenal Insufficiency

CAPPER, R. S. AND MOSER, R. H. (*Am. J. M. Sc.*, **239**: 261, 1960) from the Department of Medicine, Brooke Army Medical Centre, Fort Sam Houston, Texas, give in the following lines the summary of their observations on steroid-induced adrenal insufficiency in severe medical illness.

We have presented 4 patients demonstrating widely divergent medical diseases, yet each of them revealed the following pertinent features in common.

Response to vigorous, well-conceived and properly executed medical therapy was poor, and all patients lapsed into a state of relentless decline.

It was suspected that the patients were suffering from adrenal unresponsiveness and steroid therapy was initiated in addition to the conventional therapy for the underlying process.

The institution of steroid therapy was attended by a prompt improvement and loss of refractoriness to prior therapy.

Each patient had been on steroid therapy for an unrelated illness at some time in the past, and for one reason or another was unable to present this information to the ward officer on admission.

A plea is made for the physician to include "steroid-induced adrenal insufficiency" in his differential diagnosis of the patient who has a severe medical illness and who is unresponsive to conventional therapy.

We add our voices to the swelling chorus that beseeches prudence and caution in the administration of steroid hormones.

Migraine

Migraine may be viewed narrowly as an episodic headache with features suggesting a vascular origin, or as a syndrome with more widespread bodily disturbances. What initiates either the vascular change in cranial arteries or the visceral dysfunction? Careful clinical studies can still be useful here; and Selby and Lance have reviewed five hundred cases confirming many previous observations, some of which are well known.

In almost a quarter of their cases symptoms started before the age of 10 years. In 15 per cent there was a family history of epilepsy, and in 38 per cent one of allergy. 67 per cent regarded emotional upsets as a clear precipitating factor. 18 per cent had clouding or complete loss of consciousness during attacks. Such disturbances of consciousness, which usually are not apparently epileptic, may occur only for a limited time—perhaps during adolescence or at the menopause. In treatment the value of ergotamine tartrate was confirmed. Histamine as an intravenous infusion (not administered for slow grade "desensitisation") also proved valuable, though Selby and Lance wonder whether this acted primarily on soma or on psyche.

In considering the migraine syndrome we may be misled by too exclusive attention to the headache. Gastrointestinal disturbances and peripheral vasomotor symptoms occur; and abnormalities of fluid balance are not uncommon. These may be secondary to disturbances of neural control; but possibly the imbalance, the electrolyte changes which accompany it, or some associated endocrine abnormality plays a primary part in the attack. (Annotation, *Lancet*, **1**: 967, 1960).

CURRENT TOPIC

RESEARCH AS PART OF TRAINING*

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Sir William Osler, in 1894, while addressing the McGill Medical School said "A great university has a dual function to teach and to think". What he said so long ago is equally true today when we are in the midst of rapid advances in all sciences including medicine. During the last two decades, there have been many discussions and reports on the medical curriculum and teaching in various countries more particularly in U.K. and the United States. Naturally there are differences of opinion on some issues but all are agreed that the medical curriculum needs urgent and radical changes and that the undergraduate teaching should aim to lay the proper foundations of the student's education and to infuse in him the spirit to remain a 'student' all his life. It is now generally agreed that in the training of medical students, the teaching institution has two chief aims—namely dissemination of knowledge and its advancement, i.e., teaching and research, both of which may be regarded as two facets of a single process blending together and becoming inseparable, though the part played by each is not equal. "Research" as the experts put it "fertilises teaching". Mere memorising a mass of facts blunts rather than sharpens the essential qualities of the student. Research, on the other hand, stimulates thought in the trainee and aims to make him a thinker so that he can exercise imagination and originality in conceiving and organising experiments. Furthermore, research helps him to cultivate initiative, ingenuity, thoroughness and sustain perseverance and interest both during times of failure as well as success. Research is, thus, vital for the development of the student's mind and for his maturity. There can be no learning without research as there can be no research without learning. Each is complementary to the other. Without research, no progress in knowledge is possible. It is not enough for the student to go around the lecture theatre or library or even in the wards and take down notes. He has to be stimulated constantly by his teachers to think and inquire on the 'whys' and 'hows' of the problem. This will obviously depend on the way the students receive their training. The medical student needs, therefore, an early introduction to the basic concept of research so that he learns to be precise and accurate in his observations. Whatever may be the nature of research and howsoever minor the problem be, research as a part of training is intended to make the young student "research minded" and give him a scientific outlook so that he looks on research as a natural part of his daily work and brings to bear an analytical mind on every problem that he observes. Unfortunately, there is some misunderstanding about research—that research is only biochemical, bacteriological or pathological in nature and that only a few people especially gifted can conduct it. Research, however, implies a systematic investigation in some branch of science or learning. In other words, it is meant to inculcate in the young minds the habit of careful observation and the power of arriving at a logical conclusion. It may be clinical and/or applied. Clinical observations and controlled clinical trials are not devoid of value. In our country where the clinical material is in such abundance and of a varied nature the possibilities of clinical research can be extremely fruitful. In paediatrics particularly, an ill-planned and over enthusiastic study requiring numerous investigations on the blood samples is rather difficult unless the techniques are simplified. It is neither possible nor desirable that every student of medicine should become a research scholar but it is possible to train every medical undergraduate before he qualifies, in the methods of research. That should be our aim during the formative period of a medical student's life. Obviously this is not possible unless our medical colleges are adequately staffed. The professor should have a sufficient number of assistants to carry out the routine teaching duties and he must have time to 'think' and to guide his students into the original channels of newer knowledge and research. The young student can be easily stimulated by attending clinicopathological conferences and staff meetings. He should be encouraged to take part in them. This will create in him the zeal and thirst for newer knowledge. The most invaluable assets of an institution are not its buildings but the men who work in them. Unless these men are themselves wedded to research and are actively contributing to the science which they profess to teach, they would hardly inspire the young student. To the research-minded teacher, research as a part of training of the student is not a dull vocation—it is a thrilling adventure keeping him and his students alert in exploring the boundaries of knowledge and maintaining a scientific and critical outlook. A. J. Scott in his inaugural lecture (University Grant Commission 1936) remarked, "He who learns from one occupied in learning drinks of a running stream. He who learns from one who has learnt all he is to teach, drinks the green mantle of the stagnant pool." Medicine is an expanding subject. Gone are the days of empiricism and mysticism. The unfounded dogmatic dictums and traditional superstition have been replaced by scientific truths, giving medicine a scientific basis. The modern medical science is the product of a long evolution from superstition and ignorance. It is only through the spirit of research that the mind finds an environment to grow and become more and more inquisitive. Research activity is thus vital for the well-being and progress of any medical school. In fact the impact and quality of research programme may be taken to represent the quality of an institution. Every well run and properly organised medical school in U.K., U.S.A. and other advanced countries has already established its traditions of research. In some centres, research has assumed large proportions with equally large budgets. In most of the medical schools in India, lack of funds and excess of routine work are the two main hurdles against

* Lecture at the W.H.O. "sponsored paediatric teaching conference for South East Asia (Bangkok)" 3 June 1958.

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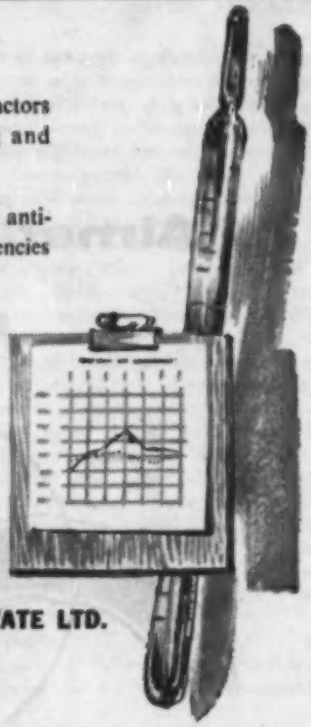

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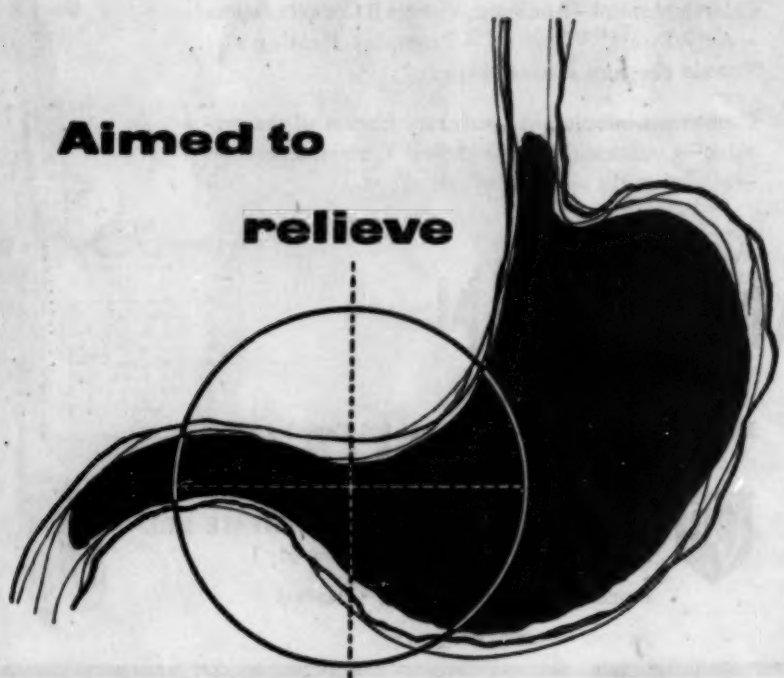

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New Delhi P.O. Box 322

research. However, as emphasised previously, analysis of properly recorded data and clinical trials, establishment of norms can at least be undertaken very easily. The Indian Council of Medical Research and some of the pharmaceutical concerns are always willing to help financially. If there can be proper planning and proper distribution of funds to the right men, we can also do research of a high order. It may be repeated again that quality is far more important than mere quantity. Integrity and honesty in experimental work and in the interpretation of its results, no matter, however, contradictory they may appear to be, are very essential requisites of the worker.

Training in research is no waste of time of the student. It is important for him to get some perspective of research even if he is to enter general practice where he will equally need a critical mind before accepting other's work. He may even pursue in his practice any line of inquiry if he has an inquisitive mind. This is well illustrated by the brilliant observation of Gregg, a general practitioner, on the association of some congenital defects in the new-born, with rubella during the 8—10th week of pregnancy. Though this finding may seem to be simple, it has brought the role of environment in the aetiology of congenital disease to the domains of experimental study. Perhaps some young persons may get keenly interested in research and may, with proper encouragement, be stimulated to continue it as a whole-time career.

The medical curriculum is, no doubt, very much overloaded already. Some attention will be needed to promote integration of teaching and research by pruning unnecessary details and introducing the idea of research. Allen observed, "An important deterrent is the fact that they (students) are so loaded down with routine class and laboratory work and examination, all hurdles which they must clear in order to secure their degree, that even when they have a worthwhile idea and want to do something about it, they lack the time and energy and often enough encouragement to do so. The future of medicine is in the minds and hands of these students and no effort should be spared to clear their way of all barriers. The truth is that real barriers to students' progress do exist in many medical schools and it should be emphasised again that every medical student, not just the gifted ones, should be afforded well supervised opportunities to learn how to apply the experimental method to test hypothesis of his own devising. This is the crux of the problem of medical education."

In what precise way, research should be introduced in the training of the student in order to be convenient and of maximum use is a question not easy to answer. However, there should be adequate emphasis on broad principles and general ideas on the subject guiding the young student how to find more information on that particular subject. The teacher even in his daily lectures should make certain that the student understands how medical facts have come to be established. Such an approach by the teacher will help to mould the student as a thinking individual from a mere cramming machine. Once the student's curiosity has been roused, he should be given a small problem for research during the final year of his medical study. The research should be of the nature of a simple and short investigation or even a balanced criticism of some clinical cases. The quality of work is not to be judged from the number of irksome investigations but on the method in which the student has presented his work and shown his critical faculty and power to weigh evidence objectively.

A weekly or fortnightly meeting of the entire staff and the students engaged in some research will be very conducive to solve many problems and stimulate further thought. Each teacher can guide the research of three or four students. The students will not only learn the research methods but also learn how to use a library and hunt for essential data. Here he would be guided as to how he can analyse his data and draw logical conclusions. Furthermore, he would learn how to put his thought in writing in a simple and chaste language. That is a discipline in itself and would be worth all the time and labour that we can spend on the young undergraduate. "The medical school", as Flexnor remarked, "can at most hope to equip students with a limited amount of knowledge to train them in the method and spirit of scientific medicine and to launch them with a momentum that will make them active for years to come."

Acknowledgment—I am deeply grateful to Prof. S. S. Anand, Professor of Surgery and Principal, Medical College, Amritsar, for his valuable comments.

NOTES AND NEWS

U.S. Grant to India for Eradication of Malaria

The U.S. Technical Co-operation Mission has made a further grant of 2·5 million dollars (Rs. 1·2 crores) to India's malaria eradication programme. This says an official press release, brings the total U.S. aid to the programme to Rs. 39·9 crores.

Under an agreement signed between the Government of India and the U.S. Technical Co-operation Mission, the amount will be utilised for the purchase abroad of 2,520 tons of 75 per cent water-dispersible DDT powder and 2,340,000 dozen microscope slides for use in the malaria eradication operations.

Health Schemes under the Third Plan

Mr. D. P. Karmarkar, Union Health Minister, said at Hyderabad on 13-8-60 that the proposed allotment of Rs. 300 crores for Health in the Third Plan was neither generous nor large, and added that at least Rs. 500 crores should be provided to enable the country to tackle diseases like tuberculosis.

The Union Health Minister, who was laying the foundation-stone of the Tuberculosis Aftercare and Rehabilitation Centre at Erragadda, near Hyderabad, said that the factors in the way of tackling the problem of tuberculosis were the paucity of resources, the inadequacy of personnel, and the decreasing tendency to rely on public support in the provision of medical facilities. There was a limit on the finance of the Government, and, ultimately they had to fall back on other resources, the Minister

added. They should be able to construct their buildings and provide the facilities at a modest expenditure. There was no need to embark upon costly building programmes and the tuberculous patients could be put up in cottages.

The Union Health Minister suggested that medical graduates should be given training in the national health problems like tuberculosis, environmental hygiene, leprosy, etc. The Minister added that if each medical practitioner took charge of ten tuberculous patients, with the Government supplying him free medicine, the problem could be solved to a large measure. Mr. Karmarkar said that it should not be difficult for the State Governments to take up the domiciliary treatment of tuberculosis with the help of the corporations.

Importance of Mental Health Stressed

A strong plea for setting up a Directorate of Mental Health and Hygiene consisting of prominent psychiatrists, mental hygienists and social workers to tackle the problem of mental diseases effectively, was made by Sri Prakasa, Governor of Maharashtra, in Bombay on 4-8-60.

Inaugurating the World Mental Health Year in Bombay at Jai Hind College, the Governor said it was time that the country began to organise community mental health services on the lines of those in the West.

The rapid industrialisation of the country and the accompanying social changes among the people were leading to a feeling of frustration which brought in their wake mental abnormalities, he said.

Mr. Sri Prakasa pointed out that two phenomena which should be investigated by those charged with the mental wellbeing of the people were the suicide cases among women and student indiscipline. Unemployment and consequent misery among the unemployed also resulted in a number of mental cases. The Governor said that emotional and psychological factors played an important role in the mental well-being of the people.

Mr. Sri Prakasa said that the problem of mental health did not receive proper attention because of the lack of a proper administrative set-up and lack of coordination of the activities of the various agencies working in the field. The system of education should be reorientated and matters concerning sex and married life should be freely discussed in educational institutions.

It was a great danger "to shut our eyes" to the consequences of mental ill-health and "this human problem should be tackled in a humane way", he addded.

Manufacture of Drugs

Mr. Karmarkar, who was replying to the debate on the Bill to amend the Drugs Act 1940 said that the Centre had already sought the opinion of State Governments as to whether the time was not ripe for the manufacture of all drugs to be brought under legislative control. The proposal for legislation would also be placed before the meeting of the Central Council of Health Ministers to be held shortly.

The Rajya Sabha passed the amending Bill, which would empower the Central Government to appoint inspectors or inspecting manufacturing premises and taking samples of drugs and provides for a minimum punishment of one year's imprisonment and fine for the manufacture, sale, etc., of certain misbranded drugs. Mr. Karmarkar said that the Bill has been introduced in accordance with the recommendations of the Central Council of Health Ministers and the Estimates Committee of the Lok Sabha, and that there would be no conflict of jurisdiction as between the Centre and the States in implementing it.

Integrated School Health Services Scheme

An integrated health services scheme, covering all school children, has been recommended for inclusion in the Third Plan by the School Health Committee, set up by the Union Ministry of Health.

At the end of the Third Plan period, it is estimated, there will be some 5·80 crore students, in the age group 6-11, in schools. The Committee has, therefore, recommended that the entire student population should be covered by the proposed scheme in stages.

The Committee, under the chairmanship of Mrs. Renuka Ray, M.P., met in Calcutta lately to finalise its interim report. It has, it is gathered, based its findings on a mass of materials submitted by different State Governments regarding school health.

From the materials made available in the Committee, it has been found that the basic cause of ill-health among school children was malnutrition. In order to tackle this problem, school feeding has, therefore, assumed a very important aspect of School Health Services. As financial requirements for a big project of this nature, will be large, phasing is understood to have been found absolutely necessary, starting first with places, where health centre services are already available.

So far as the School Health Services are concerned, the scheme will cover medical examination of students, as also a regular follow-up of students' health. This programme to build up not only the health of the future generation of the nation, but to improve environmental hygiene and sanitation as well, will provide a big scope for utilising the services of a large number of medical practitioners, particularly in a State like West Bengal, where their number is too many. In West Bengal, for example, the student population proposed to be covered by the scheme would be about 33 lakhs. A large number of doctors would, therefore, be required.

It has been suggested that the scheme should be integrated with the national health plan, so that the utilisation of available medical services could be ensured.

Need of Scientific Research Stressed

Prof. M. S. Thacker, Director-General of Scientific and Industrial Research, said on 15-8-60 that scientific research should be given high priority under the Third Plan.

Inaugurating a three-day seminar on proteins organised jointly by the Chemical Research Committee and the Society of Biological Chemists of India, he said that if one per cent of the total Third Plan outlay was earmarked for scientific research, the Government would do not only well, but also nobly. It was pointed out

that although the national laboratories were doing useful research work there was difficulty in the application of results by the industries. "If a country like India is to develop on modern lines, there is no denying that it has to accept the importance of scientific research and technological progress", he added.

Family Planning in India

While inaugurating a health education and family planning programme sponsored by the Mahila Navajivan Mandal, a social welfare organisation of Hyderabad, on April 14, the Union Health Minister, Mr. D. P. Karmarkar suggested opening of family planning sections in every hospital and dispensary of the country. He also suggested creation of a band of family planning education leaders who could reach the remotest corners of the country to propagate the idea. The message of family planning, he added, had to be carried with a religious zeal by the people themselves. This was mainly the task of social organisations like the Mahila Navajivan Mandal.

The Bombay Obstetric and Gynaecological Society

The 9th intensive Refresher Course in Obstetrics and Gynaecology will be arranged by the Bombay Obstetric and Gynaecological Society from 7th November to 12th November 1960. A fee of Rs. 15/- (Rupees fifteen only) has to be paid in advance for registration of the names of candidates for this course. Candidates will have to make their own arrangements for boarding and lodging.

A candidate requiring any special subject to be treated during the course, may forward his request for consideration. Further information will be available from the Jt. Hony. Secretary of the Society at Purandare Griha, Chowpatty Sea Face, Bombay-7.

K. G. Medical College to Celebrate Golden Jubilee

The Golden Jubilee Celebration of the K. G. Medical College, University of Lucknow, will be celebrated from January 18 to January 25, 1961. All old boys of this Institution have been requested to contact Dr. Tara Chandra, Joint Secretary, K. G. Medical College Golden Jubilee Celebration Committee, giving their present address.

REVIEWS

Fundamental Techniques of Plastic Surgery and Their Surgical Application—By Ian A. McGregor, M.B., F.R.C.S. (ENG.), F.R.F.P.S. (GLAS.). 1960; E. & S. Livingstone Ltd., Edinburgh; 8½" × 5½"; pp. viii+244; price 30sh. net.

The importance of reconstructive work in surgery is recognised by every modern surgeon and plastic surgical methods are being used increasingly by them in different fields of surgery, particularly in the surgery of trauma.

Textbooks on plastic surgery are usually very elaborate and do not describe the basic principles in sufficient detail for every one to follow. The author has very ably described the basic techniques of plastic surgery very clearly and with all the necessary details in a small book which will not only be appreciated by the general surgeon but will also be of great help to any young surgeon aspiring to specialise in plastic surgery.

The book is divided into two parts. The first part, devoted to the basic principles of plastic surgery with particular stress on the difficulties and complications of each method, is extremely well written. The second part deals with the surgical application of some of the methods in situations likely to be encountered by surgeons. The descriptions are sufficiently clear for any surgeon to follow.

The large number of photographs and drawings are helpful.

ANJALI MUKERJI

Chirurgie der Arterien—Von Doz. Dr. K. Kremer, Düsseldorf. Mit einem Vorwort von Prof. Dr. E. Derra, Düsseldorf. 1959. VIII, 280 Seiten, 150 Abbildungen, Gr.-8° (Georg Thieme Verlag, Stuttgart), Ganzleinen DM 59.—

Surgery of the Arteries (in German).

Professor Derra in his foreword points out that as early as 1913 E. Jeger in his book showed surprisingly mature knowledge and understanding of cardiovascular surgery. The stormy development of this speciality in recent times is due mainly to progress in the technique of anaesthesia and diagnosis, improvement in blood and fluid substitution, and shock treatment, and the discovery of antibiotics and anticoagulants. Anyhow, the progress of arterial surgery is astounding and the author's aim is to show that the arteries are a worthwhile object of surgery and one that can be taken up without a complicated apparatus, except for the big operations on the aorta and other large vessels.

General vascular surgery is subdivided into chapters on history, and technique of this surgical branch, problems of vessel substitution, and diagnostics. The special part deals with congenital alterations of the vascular system, such as anomalies of the aortic ostium, coarctation, deep aortic stenosis, patent duct, aortopulmonal fistula and transposition of the large vessels. Of acquired alterations we find injuries, aneurysms, arteriovenous fistulas, arterial and pulmonary embolism, and the aortic arc syndrome. Under the heading 'Coronary ischaemia' are sections on autonomic nervous surgery (sympathetic, parasympathetic and both combined); total thyroidectomy and three different methods to improve myocardial blood supply by direct vascular surgery. Twenty pages devoted to peripheral arterial ischaemia, arranged according to the three levels of surgical interference, and the aortic bifurcation syndrome conclude this monograph, except for particularly numerous references—more than 20 pages in small print, although at the end of each of the previous chapters ample literature in German, English and French is to be found.

This book is highly instructive, fully up-to-date and beautifully got up. It can be warmly recommended not

only to surgeons but also to physicians who have to work out the operative indications.

ROBERT HEILIG

Lehrbuch der Geburtshilfe—Von Prof. Dr. H. Martius, Göttingen. Unter Mitarbeit von Prof. Dr. H. Hartl, Göttingen, und K. Droysen als Zeichnerin. 4, verbesserte Auflage, 1959. XXIV, 731 Seiten, 768 zum Teil mehrfarbige Abbildungen, Lex.-8° (Georg Thieme Verlag, Stuttgart), Ganzleinen DM 59·70.

Textbook of Midwifery (in German).

This book, of which the first edition appeared in 1948, has reached its fourth edition in 1959, has been translated into Italian and Spanish and has become the German standard textbook of obstetrics just as its companion volume on gynaecology is the uncontested guide in its subject.

Martius is a master not only of gynaecology and obstetrics, medical as well as surgical, and of physiology and pathology of the newborn, sections that in the present edition have been brought up-to-date again, but particularly as a teacher there is nobody to reach him. The selection of material, the emphasis on the essential is equally satisfying to the practising obstetrician as to the student; the lucidity and terseness of his expression are unsurpassed. These 700 pages are packed with the most reliable information and so generously illustrated that every step is guided by the words of the most experienced and enlightened teacher and drawings by Miss Käthe Droysens, his lifelong illustrator.

The get-up of this splendid volume is perfect in every respect; no wonder that the author dedicated it to the publisher on his 75th birthday.

ROBERT HEILIG

Die Laparoskopie und die Culdoskopie in der Gynäkologie—Von Dr. H. Frangenheim, Wuppertal. Mit einem Vorwort von Prof. Dr. K. J. Anselmino, Wuppertal. 1959. VIII, 70 Seiten, 98 teils mehrfarbige Abbildungen, 8° (Georg Thieme Verlag, Stuttgart), kartoniert DM 19.80

Laparoscopy and Culdoscopy in Gynaecology (in German).

This handy booklet is based on the author's personal experience of 500 endoscopic examinations of the pelvic organs and structures. The technical part gives step by step careful instructions about instrumentation and preparation for and carrying out of laparoscopy and culdoscopy with a frank discussion of possible complications.

The clinical part deals with indications and contraindications of both these methods and the role they play in the diagnosis of ectopic pregnancy, causes of sterility, endometriosis, peritoneal and genital tuberculosis, other diseases of the peritoneum, and ovarian tumours; a survey of the author's own cases concludes the text. This is followed by an atlas of 41 beautifully reproduced colour photographs, each accompanied by a diagrammatic drawing which explains every detail of the endoscopic picture; the legends are informative. This is a very useful publication.

ROBERT HEILIG

Konservative und chirurgische Behandlung angeborener und erworbener Herzfehler (3 Vorträge)—Von Prof. Dr. E. Derra, Düsseldorf, Prof. Dr. O. Bayer, Berlin, und Dr. H. H. Wolter, Berlin. 1959. IV, 64 Seiten, 25 Abbildungen, 8° (Georg Thieme Verlag, Stuttgart), kartoniert DM 6·40.

Conservative and Surgical Treatment of Congenital and Acquired Heart Diseases: 3 Lectures (in German).

These lectures have been delivered at the First Cardiological Postgraduate Course at Berlin-Moabit in May, 1958. This borderland between medicine and surgery is subject to rapid changes due to the continuous broadening of surgical indications. The three stages of closed heart surgery, open surgery with short lasting switching off of the circulation in hypothermia and finally, long lasting open heart surgery using the heart-lung machine are well outlined; the last stage, according to the date of these lectures more than two years ago, has been only just touched upon. Prof. Derra in 36 pages gives an excellent report about his experiences on 2000 heart operations, mostly on congenital malformations but also on mitral stenosis, of which his clinic operates daily 2-3, and aortic stenosis. His article is illustrated with wonderful photographs of the operation area and excellent diagrams explaining the findings and the operation method. Prof. O. Bayer discusses pathological physiology, symptomatology and conservative, i.e., medical treatment of acquired heart diseases strictly from the point of view of future surgery, an unusual and stimulating approach to a problem that has been discussed threadbare; the latest diuretics of the chlorothiazide group have not been included yet. The lecture by Wolter gives a systematic and competent survey of indications for cardiac surgery. Altogether, this slim volume amply repays the time of studying it, although it does not cover the very latest position of this quickly developing subject.

ROBERT HEILIG

Hörtraining: Geschichte, Voraussetzungen, Methodik and Aussichten bei Kindern und Erwachsenen—Vol. Priv.-Doz. Dr. G. Beckmann und Dr. A. Schilling, Marburg/L. Mit einem Geleitwort von Prof. Dr. J. Berendes, Marburg/L. 1959. X, 123 Seiten, 47 Abbildungen, Gr.-8° (Georg Thieme Verlag, Stuttgart), kartoniert DM 24.—Zwanglose Abhandlungen aus dem Gebiet der Hals-Nasen-Ohren-Heilkunde, Heft 4. Vorzugspreis für Abonnenten der "Zeitschrift für Laryngologie, Rhinologie, Otologie und ihre Grenzgebiete" DM 21·60.

Hearing Training: History, Preconditions, Methods and Chances in Children and Adults (in German).

With the present generalised tendency to enjoy everyday acoustic treats such as are offered in theatre, cinema, radio and lectures, the purely mechanical aids prove unsatisfactory for those hard of hearing.

After many attempts in various countries it turned out that a systematic and manysided hearing training could achieve astounding improvements while fully utilising electro-acoustic magnifiers. As these methods remained widely unorganised and unknown in Germany,

the authors studied not only foreign literature but went abroad to see the working of these surprisingly successful methods in the U.S.A., U.K., Denmark and Holland. The present monograph represents a first attempt to adapt these foreign achievements to conditions in Germany. The four parts of the present volume deal with the history of such a therapy, its physical and psychological preconditions, hearing training in children and in adults. The references in several languages fill 7 pages. As hearing training has to be closely fitted to the language of the patient, it has no sense to give here details of the methods. But a perusal of the text shows that the authors did hard and painstaking pioneer work in this special branch of otolaryngology.

ROBERT HEILIG

Hormone: Einführung in ihre Chemie und Biologie—Oldrich Hane, Dr.-Ing., Forschungsinstitut für Pharmazie und Biochemie, Prag. Den Abschnitt über die Analyse der Steroidhormone in biologischem Material bearbeitete Ph. Mr. Oksana Siblíková, Prag. Nach der 2., umgearbeiteten, tschechischen Auflage ins Deutsche übersetzt von Dr. Erika Riedl-Tůmová, Prag. Mit 9 Abb. im Text und 6 Tafeln. XII, 633 S., gr. 8°, 1959. Ganzleinen 40,—DM.

Hormones: Introduction into their chemistry and biology (in German).

This book has been translated into German from the second enlarged edition of the Czech original. The author is not a medical man but a chemist. Accordingly emphasis is laid on preparation, isolation, assays and chemical qualities of the various hormones which are discussed in considerable detail according to their chemical character as hormones of tyrosine-like structures, steroid hormones and their metabolism, hormones of peptid structure and hormone action. Every chapter is concluded by a considerable number of references, fairly complete including those of 1957, a few even of 1958, predominantly from Anglo-American literature.

This is a reliable text, clearly written, full of relevant information, reasonably uptodate, which biochemists working on endocrinological subjects would certainly find very very useful. Particularly the chemical data are given in greater detail than in similar books written by medical authors. Gustav Fischer, science publishers of old repute, got up the book very handsomely and gave it a particularly attractive binding.

ROBERT HEILIG

Fermente Hormone Vitamine und die Beziehungen dieser Wirkstoffe zueinander. 3., erweiterte Auflage in 3 Bänden—Unter Mitwirkung von Pachgelehrten herausgegeben von Prof. Dr. Dr. R. Ammon, Homburg/S., und Prof. Dr. Dr. W. Dirscherl, Bonn. 15% ermässigter Subskriptionspreis für das Gesamtwerk. Der Subskriptionspreis gilt bis zum Erscheinen des letzten Bandes. Jeder Band ist einzeln zum Ladenpreis käuflich. (Jeder Band enthält ein Kurzregister. Das Gesamtregister wird nach Abschluss des Werkes an alle Bezieher unberechnet geliefert.). **Band I: Fermente**—Bearbeitet von R. Ammon, Homburg/S., und K. Myrbäck, Stockholm. 1959. XX, 564 Seiten, 34 Abbildungen und 53 Tabellen, Lex.-8°, (Georg Thieme Verlag, Stuttgart), Ganzleinen DM 96.—, Subskriptionspreis DM 81·60.

Ferments, Hormones, Vitamins and their Mutual Relations: Volume I—Ferments (in German).

The 3rd edition of the present work, which was first published in 1938, had to be enlarged to such an extent that each of the three groups of energists mentioned in the title required a volume of its own. Although the correlations between them shall be systematically treated in volume III, every opportunity has been used to point them out throughout the text. Prof. Ammon of the Institute of Physiological Chemistry, University of Saarland, has written the chapters on history, esterases, carbohydrases, C-N-hydrolases including amidases and proteases and various phosphatases, covering altogether 340 pages. Prof. Myrbäck of the Institute of Organic and Biochemistry of the University of Stockholm has dealt with transferases, isomerases, lyases, enzymatic decarboxilisation, biological oxidation, anaerobic carbohydrate degradation, citric acid cycle, oxidative phosphorylisation, fatty acid cycle, and photosynthesis. The literature in every language in which essential work is being done has been completely considered inclusive of 1958. It seems a good arrangement that the references have been put at the foot of every page. There is a "short index" of 7¼ pages at the end of this volume while a much more detailed one will be published when all the three volumes have appeared. This is not a book for the general practitioner but enzymes have assumed such a significance that almost every one doing fundamental research must be acquainted with this subject without which no biological process can be understood. The name of the authors guarantees that this volume will remain the last word on enzymes, the German standard work against which all the other texts will be measured until a new edition appears. The get-up of this book is of the same high standard as that of all the other Georg Thieme publications.

ROBERT HEILIG

OBITUARIES

Sir Joseph William Bhore

Sir Joseph William Bhore died on August 15 in Guernsey (Channel Islands) where he lived in retirement. He was 82.

Sir Joseph was born in an Indian Christian family in Nasik, in Maharashtra, in 1878. He entered the I.C.S. in 1901 and, after a series of appointments in the Madras Presidency, came to London in 1920 as Secretary to Sir William Meyer, the first High Commissioner for India in London. He acted as High Commissioner before returning to India in 1924 as Secretary to the Government of India, Department of Education, Health and Lands.

After working as Joint Secretary of the Simon Commission (1927) Sir Joseph worked as a Member of the Viceroy's Executive Council being the first Indian to

hold the portfolio of Industry and Labour. He represented India at the silver jubilee celebrations of the Coronation of King George V in 1935 and after retirement settled down in Guernsey.

When the Germans occupied the island, he lost his property and returned to India. During the war he served again in India until 1946, his last achievement being a voluminous report on health services which formed the basis of the present health insurance in India.

Dr. C. A. Martins

Dr. C. A. Martins suddenly passed away on 5th July, 1960. He graduated from the Grant Medical College, Bombay, and worked as a tutor in surgery for several years. He began his career with Dr. S. R. Moolgaokar in Bombay before he left for Edinburgh in 1933 to qualify for F.R.C.S.

On his return Dr. Martins got an appointment in the Junagadh State Hospital and later with the Indian Government in the capacity of a C.M.O. until he retired in 1955, after 19 years' service. During his tenure he made several changes in the hospital, re-equipping and remodelling the hospitals in general and the operating theatre in particular. He started an eye hospital and a nurses' training school and introduced Radiology and Dental departments.

He was the Founder President of the I.M.A. (Junagadh branch), Red Cross Society and Founder President of the Rotary Club. He was also Inspector General of jails for a time. He was the Chairman of the Scientific Section of the 7th Gujarat and Saurashtra Medical Conference, 1954.

On retirement Dr. Martins established practice in Bombay. He was the vice-president of the St. Luke's Guild in Bombay and a member of its editorial board.

His whole life was dedicated to the cause of the suffering humanity.

Dr. D. K. Dutta

Dr. Dhirendra Kumar Dutta, M.Sc., M.B., suddenly expired at Monghyr on the evening of the 17th July, 1960 while he was working in his clinic. He had an attack of coronary thrombosis.

Dr. Dutta was born in 1900. He had a uniformly brilliant career both in the general line and in the Calcutta Medical College. He got First Class First in M.Sc. in Physiology, of the Calcutta University. He graduated from the Calcutta Medical College in 1928.

Dr. Dutta settled in private practice at Monghyr in 1934 and was the leading physician of the town for the last several years. He was the founder of the Bihar Chemical Industries Ltd., Monghyr. His philanthropy and love for the poor and afflicted was proverbial in the town and he was universally respected.

Dr. Dutta was a founder-member of the Monghyr Branch and had been its Treasurer throughout. He was also a Vice-President of the Bihar State Branch at the time of his death. He used to take keen interest in the affairs of the I.M.A.

Dr. T. D. Nair

Dr. T. D. Nair, L.A.S. (Kenya), D.T.M. (Lond.), L.M. (Dublin), passed away at his residence, Major House in Pallikunnu, Cannanore, on July 17, 1960, after an attack of cerebral haemorrhage. He was 75.

Dr. Nair went to East Africa as a medical assistant in the year 1907. He served in the 1st World War, in the 3rd King's African Rifles. In 1919 he went to England and obtained Diplomas in Tropical Medicine and Midwifery. On his return, he served as an assistant surgeon in the Kenya Medical Service. In 1955 he retired and returned to India. He settled down in Cannanore where he started the North Kerala Clinical Laboratory. He was a very active member of the North Malabar Branch of the I.M.A., and a high ranking district official of the Masonic Lodge in East Africa.

DR. C. A. MARTINS

DR. D. K. DUTTA

DR. T. D. NAIR

SUPPLEMENT
Journal of the Indian Medical Association

Vol. 35, No. 6 CALCUTTA September 16, 1960

X ASSAM MEDICAL CONFERENCE, 1960, JORHAT

The 10th Assam Medical Conference was held on February 20-22, 1960 at Jorhat under the auspices of the Indian Medical Association, Assam State Branch. The Conference was inaugurated by Sri R. N. Brahma, Medical Minister of Assam and presided over by Dr. G. S. Das.

The annual State Working Committee was held in the afternoon of 20-2-60 and in the morning of 21-2-60.

Sri R. N. Brahma the Medical Minister in his inaugural speech wholeheartedly appreciated the activities of the Indian Medical Association specially the relief works organised during the last flood havoc and expressed heartfelt thanks to the members of the Associations. He requested all the medical men to acquire the spirit of service and sacrifice.

Dr. J. K. Saikia, Retired Director of Health Service and the Chairman of the Reception Committee welcomed the distinguished guests, delegates and visitors of the conference. In his welcome address he remarked that the health plans and various schemes made by the Government should be prepared in such a way that the poor rural mass constituting about 85 per cent of the population should derive more benefit than the well-to-do urban people.

The Pharmaceutical and Scientific exhibition was inaugurated by Sri Sebeswar Sarma. In his inaugural speech he expressed that the science of healing was as old as humanity and was improving with the progress of civilisation. He was highly impressed at the all round progress of the medical science during the recent years and expressed high hope for the future.

The Hony. State Secretary Dr. B. N. Chaudhury gave a brief account on the activities of the State Branch, I.M.A. during the year 1958-59. In his brief report he gave a short account of the medical relief activities performed during the last flood in Assam and expressed heartfelt thanks to all the benevolent state and local branches of I.M.A. who had so kindly donated in coins and kinds to give relief to the flood affected people. He further requested all the medical men of the State to be members of I.M.A. and to co-operate with the State and the Gauhati Branch, I.M.A. to make the 37th All India Medical Conference to be held at Gauhati in the month of December, 1960 an absolute success. He emphasised that Assam was wellknown from time immemorial for her hospitality, so this time too she should not lag behind her legendary past. There was a scientific seminar inaugurated by Prof. S. N. Sarma, Principal, Assam Medical College. It was arranged in different sections i.e., Medical, Surgical, Gynaecological, Ophthalmological etc. Many of the delegates took active interest in the deliberation.

PRESIDENTIAL ADDRESS

Dr. G. S. Das, the president in his address said the following :

The question of rendering medical aid to our 80 p.c. population residing in rural areas has been engaging the attention of the Government and the medical men specially after the Independence. Medical relief and public health amenities in the rural areas of our country are not adequate. We are pleased to admit that the Government are trying to make an all round improvement in the villages and give medical relief to the rural population. Our young medical graduates, who were reluctant to go to serve in rural areas a few years back, are now gradually going to serve in the rural dispensaries. This is undoubtedly a happy sign.

The State is facing acute shortage of medical men to properly man the large number of dispensaries in rural areas. To cater the need, we hope the next Medical College should be started without further delay within the 2nd Five Year Plan period.

The economic condition of the doctors serving in villages should receive serious attention of both the Government and the Association. I would suggest that the Government should give non-practising allowance which should be categorized, to the doctors serving in a very backward place and to those whose duties deprive them of private practice. Soviet Russia has solved the problem of rural medical relief by paying an extra pay of 20 per cent to doctors serving in rural areas as compared to those serving in cities. Can our Government both in the Central and State not extend such concession to our doctors serving in the remotest rural areas? The condition of the subsidized dispensaries in this State is very unsatisfactory. The subsidies given to the doctor and the dispensary are very meagre. This should be reviewed without further delay. People must have free medical aid in our country too.

Emergency Medical Relief

It is a happy augury that whenever any emergency arises in the state due to flood, natural calamities or due to any unforeseen occurrences—the members of the I.M.A. rise to the occasion and immediately rush to the field and render all possible medical aid and give full co-operation to the Government and other organisations in taking control measures. Absence of epidemic diseases after flood, quick control of the outbreak of Plague in the State about a couple of years back and other epidemic diseases are the results of joint and sincere efforts of the members of the I.M.A. and the officials. I hope they will maintain this spirit of service in all emergencies and eventualities. My thanks also go to the members of the other social organisations Assam Medical Relief Committee, Red Cross Society, Sankar Mission. Ramkrishna Mission, Assam Seva Samity, Kasturba Gram Sevika Training Institute, Bharat Sevak Samaj and other similar organisations for their relief services to the people in distress and need.

Medical Aid in Urban Areas

The present arrangement of the district and subdivisional hospitals are not so satisfactory though Government has been able to improve the hospitals to some extent under plan programme. These are not well equipped with specialists. Beds are inadequate in number particularly in the district hospitals to meet the

demand. Every where there is enormous rush of patients and many are refused admission and some are even accommodated on the floor. It is the poor patients who suffer most and are deprived of the benefit of the special type of treatment as it is beyond their means to afford the cost of medicines and private treatment. The middle class patients are to suffer most and are indirectly denied the benefit of the expert advice as they neither can afford to pay the charges of the paying ward and consultation fees nor they like to be admitted in the general ward. The payment of operation fees in the paying ward are also high. The practice of paying share to the so-called skilled medical men should no more be encouraged. This practice creates jealousy amongst the other staff in the hospitals, who are also to do hard and arduous nature of duties and responsible works even at dead of night. Special pay allowance should be given to the deserving persons having special qualifications. The present rate of laboratory fees also should be reduced. This will stop corruption to some extent and at the same time give some relief to the patients.

I am glad to know that the Government contemplates to provide for specialists and technical personnels and increase some beds in the Third Five Year Plan. Still then it will be difficult to solve the problem as with the increase of population, bad sanitation of the municipalities and towns, defective mode of living, sickness is likely to increase with consequent demand to meet the need.

Quackery

It is a social evil. In western countries quackery is a crime. It is deeprooted and is flourishing in the country. The quacks take the advantages of the ignorance, poverty, illiteracy and superistition of the uneducated mass. We talk about taking drastic measures —but no tangible steps have been taken. I hope I.M.A. will devise ways and means and urge upon the Government to eradicate this social evil. In these days of scientific advancement we can not allow our people to be treated unscientifically. I hope government will be pleased to introduce a Bill at an early date as an amendment to Indian Medical Degree's Act of 1958—similar to the bill introduced in Punjab Legislative Assembly.

Adulteration of Food and Spurious Drugs

Adulteration of food has become rampant in the country. More than 50 per cent of the samples tested in the Public Health Laboratory are reported to be adulterated in our state. Articles whether eatable or drinkable, cosmetics and even drugs and other essential things of life are found to be adulterated to-day.

These matters are being repeatedly discussed in the assembly too—vigorous and effective measures should be taken to do away with this evil.

Problems of Medical Men in Service

The doctors in service are not satisfied with their present emoluments which are not commensurate with their arduous and risky nature of duties. The emoluments and allowances in the neighbouring countries are much higher. A doctor is to work day and night during emergencies he can neither enjoy the gazetted holidays nor Sundays and half holidays. Even the labourer is entitled to charge for his extra labour he puts in but it is a great pity that a medical man is not paid for his works. We are conscious of the limitation and resources of our Government. Also we realise that it is not possible for the employer to fully satisfy and accede to all the demands of their employees, but surely there are reasons for special considerations for special type of works.

The position and the condition of the doctors particularly those of the Public Health side are not at all improved after the amalgamation, neither they are benefited in other respects. In some cases it has put them in awkward position. The pay scale and allowances are not at all attractive. In my opinion the posts of Regional Deputy Director of Health Services should be abolished and their services can be better utilised in different set up.

The position of the Medical Licentiates in service remains unchanged. In some cases it has become worse. Even in the present set up of national health service it is no longer justifiable to continue the invidious classification of services into so many cadres. After so called amalgamations their position has become still worse. One who are confirmed and promoted to S.D.M.O.H. and was working creditably has been posted to Epidemic Unit or to an interior dispensary and an A.S. II servicing even for 25 years are not allowed to hold charge of a Primary Health Unit. The services of A.S.II of a permanent cadre serving for 25 years becomes temporary again as soon as he qualifies as a medical graduate and promoted to A.S.I. All these have led to a state of frustration in the minds of a major section of medical men in service. How can you expect sincere service from frustrated persons? Inspite of repeated representations by the Association nothing has been done in this regard, though other sister states have done away with this caste system. I urge upon the Government to be bold enough to unify the cadre of services without further delay, in the line suggested by our Association.

We are sorry that discontent prevails amongst the teaching staff of the Assam Medical College. While payscales of all the newly established institutions (Engineering College, Agriculture College, etc.) have been revised, it is only the payscales of the teaching staff of the Assam Medical College have remained unattended to for the last 4 years. Government is thinking of equipping the district hospitals with specialists like Surgeons, Gynaecologists, Ophthalmologists, etc. But how can we have experienced specialists, unless they are given special pay befitting their nature of duties and status? I hope the Government will be pleased to give serious consideration to this matter.

Medical Men in Tea Estates

The problem of the Assistant Medical Officers of the Tea Garden Medical Services are discussed almost in every session of the I.M.A. Though there is some improvement regarding their pay and allowances security of service and status are not guaranteed. They are victimised on filmsy grounds. I request the Tea Estates Authorities to be pleased to consider the grievances favourably, and our Association too should take up the subject with right earnestness again and pursue the matter till the object is achieved. The present arrangement of Medical Service in Tea Estates are not satisfactory. I will deal with some points and hope this will receive deep consideration of all concerned.

(1) Government can not deny its responsibility for the health of tea garden people. They are citizens of India and have every right to demand reasonable medical aid and specialist treatment. To achieve this, Government should bring the entire tea garden medical service under the direct control of the Government. If this is not feasible at the moment there should be some inspection (periodical) by Civil Surgeon to see that proper health service is maintained.

(2) There is no standard diet for garden hospitals which vary from place to place according to wish of either the Manager or Calcutta Agency House. I.T.A. should declare a standard diet for all gardens as far as practicable, so that a clear-cut policy may be adopted every where.

(3) Tea garden service being autonomous depending upon whims of individual manager, there are peculiar system and customs in Tea gardens. Discrimination in the matter of treatment of patients in garden hospitals must go in our socialistic

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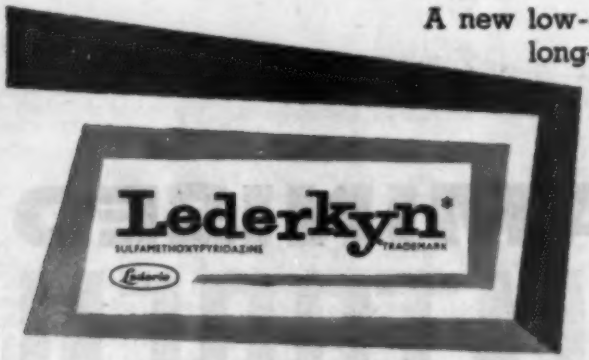

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pattern of Government. Preferential treatment to any section is untenable during these days. W.H.O. has also declared in the same line. "No discrimination to any one, nationality and political belief". This must be uniform.

(4) Working system :—This is also most unsatisfactory. For the proper running of the hospital some working systems must be maintained. In the absence of the same it is the service which suffers. Arrangement must be made for implementing of some suitable working systems to all garden hospitals in relation to all recognised hospitals of the State, either Government or missionary. I am informed that the system prevailing at Panitola hospital is probably the best system run in any tea garden of Assam. Where is the difficulty in implementing it to all other gardens? Jorhat Tea Co. has also improved their working system to cope with the present day need.

(5) Appointment of C.M.O.s. :—In my opinion only the qualification and experience should be the only criterion in selecting a man for this highest responsible post. People have right to demand that a man with highest qualities to be made responsible for the look-after of their health. So far my knowledge goes, Tea Agencies are still in the habit of appointing C.M.O.'s for these posts unexperienced medical graduates only considering their colour and creed. For these posts proper advertisement should be made in the paper and I am sure candidates better than these will be available.

(6) There is no clear-cut policy regarding further study for tea doctors—as a result there is no scope for improvement of the service. Government should enforce some rigid rule so that employers may be compelled to do something in this regard.

(7) Implementation of plantation of Medical Act of 1951 will increase the over-burdened A.M.O.'s works—result will be deterioration of service unless extra-hands are taken to relieve doctors from clerical work.

(8) In many gardens T.B. patients are not accommodated separately in a separate ward or block. This is detrimental to the interest of the non-tubercular patients. There should be separate ward for the T.B. patients.

Medical Education and Training

It is contemplated to upgrade the District and Sub-Divisional Hospitals with Specialists in Surgery, Medicines, Gynaecology and Obstetrics, E.N.T., Radiology etc. during the Third Five Year Plan. We will require a large number of such specialists for the proposed Medical Colleges and also for the Employees State Insurance Scheme. I would therefore request the Government to make liberal provision for post graduate training in the existing college or any other special college in the country or abroad. Provision for refresher course and technical training should also be made. Our medical men too should try to go for special training and study for their own interest and for the interest of the society, which needs large number of social medical men.

Union Minister of Health is understood to have said that special attention will be given to improve the deteriorating standard of teaching in Medical College owing to the paucity of trained teachers. We have now a total strength of about 2,000 teachers in the Medical Colleges. So emphasis may have to be given for more expansion of the colleges and get more personnels trained. Liberal provision for granting scholarships and other facilities should be made to get as many medical men as possible trained as specialists.

Research

In addition to the scheme and programme of Indian Council of Medical Research efforts should be made by our State Government to make provision for Research in Food and Nutrition and Indigenous herbal medicines in the Medical College and Pasteur Institutions. This will encourage our brilliant students, chemists and doctors and give a scope in the field of research. Assam Forests are full of rich herbs which must be explored. I hope the science society of the State will pursue and make efforts to organise research works.

Our Health Plan

I am glad to see that the Union Health Ministry has led more stress to tackle the communicable diseases and water supply under National Plan programme. But the plan outlay of about 10 p.c. of the total outlay of 1000 crores seem to be quite inadequate for the purpose. America spends 20 to 25 P.C. of their income on Health programme. We are glad to see that our State Government have drawn out a plan for the development of Health programme under Third Five Year Plan in consultation with the leading members of the I.M.A. including its President. The size of the outlay being about 10 crores. I hope our Government will press for the sanction by making our case strong and special one considering the peculiar position of the State.

Tuberculosis in Our State

Tuberculosis, which is the worst type of all communicable diseases, has become a menace to the country. It is killing about 5 lakhs of patients every year in India. Although no exact statistics of the increase are available there is no denying of the fact that it is increasing and has created a serious socio-economic problem to the country. Though about 700 beds have been provided in the State till now, it is quite inadequate to meet the growing demands. In every Chest Hospital there is rush for admission. It has spread to interior villages too. Majority of the cases come from poorer and middle class people. They come to town to get them examined and for admission into the Hospital and stay temporarily in hostels, house of relatives and to verandahs and platform of the Railway and Motor Station—thus creating a nuisance and danger to the people. Tangible precautionary measures are not taken by the Municipal authorities or by the Health Department. Majority of the T.B. patients can not afford to meet the cost of treatment. Number of free beds in the Hospital is very much limited. Very little measure except the B.C.G. vaccine have been taken in this state for control and prevention of the spread of this fell disease. I hope the members of the Profession and the Health Department and other authorities like Railway, Tea and Industial concern will give serious thought over the problems and suggest practical measures for its solution. Merely increasing the number of beds and clinics cannot solve the problem. Vigorous measures should be taken to fight this disease. It is a community health problem. It should receive the highest priority in our National Plan. T.B. workers should receive special consideration as regards their pay and other amenities.

Leprosy

This disease also has created a community health problem. Dependable statistics are still wanting but it is fact no doubt that this disease is also increasing particularly among the 'tribal people and people residing in the submountain area of this State. The measures taken by our State Government and other social organisation like Sankar Mission, Assam Seva Samity, Bharat Sevak Samaj are not adequate. The problem requires vigorous tackling. Extensive survey and investigation are necessary for which few special medical units should be created. I am glad to see that this disease has also

been included under National Plan of the Central Government for which our thanks goes to the Ministry of Health.

Mental Health

Mental illness has become a world problem to-day. It is why the W.H.O. has been trying to focus the attention of all concerned throughout the world. Even in the developed countries insanity rate is about 1 p.c. and the rate of neurosis is approximately 10 per cent. In India about 2 per thousand of our population is likely to be afflicted with mental disorder, which sooner or later requires hospitalisation. The rate of mental defectives is at least 8 to 10 per cent per thousand of our population. In our country at least 1,750,000 (Seventeen lakhs and fifty thousands) crimes are committed every year. About 15 to 17 thousand persons commit suicide in a year and about 15 to 20 per cent of our teenagers are juvenile delinquents. In America there are about 9 million people suffering from mental illness. It is therefore seen that mental diseases are alarmingly increasing not only in our State or country but throughout the world to-day. The size of our headache has also tremendously increased throughout the world. This can easily be judged by the fact that in 1956, 14,000,000 lbs. of aspirin was produced in America alone.

The strain and worries of the modern civilisation, increase of population, change of life, disputes, unhealthy competitions—political or otherwise, defective education, economic distress are some of the major causes for the high incidence of mental diseases including lunacy. The available facility for the treatment of such patients is the only Mental Hospital at Tejpur. This hospital therefore should be raised to a full-fledged psychiatric Hospital of modern type with increased number of beds as early as possible. This will add to the educational facility for imparting knowledge in the subject to the medical students too. Our Association too should give serious attention to this alarming problem.

Family Planning

Prof. Julian Huxley—the well known scientist said recently that mounting population is more dangerous than rockets or atom-bombs. He stated that we have not the resources to feed half the population and educate them. In view of these warnings for the rapid increase of population of the family, planning board is reported to be of the view that family planning services should be made available in the third plan at 36,000 medical and health institutions in India. To achieve this target it is proposed to train the staff working in these institution. Evil effects of over population can be summarised as follows :

(1) Deterioration of educational Standard, (2) Undernourishment, (3) Mounting unemployment, (4) Undermining of Women's health, (5) Threat to peace and progress.

Therefore the profession is to play a great role in this world problem. The public should be alerted and advised about the scientific method of controlling over population—natural and artificial. Besides vigorous propaganda against superstition, early marriages, mode of living etc., should be carried on.

Doctor—The Friend, Philosopher and Guide

The primary duty of a doctor is to organise for a healthy life and healthy existence of mankind and not merely to cure the sick and relieve the suffering. He should try to prevent illness in the society. The welfare of human existence lies in the hands of doctors. Homes of the people are freely open to the doctors. The doctor knows the problem of his patients and the patients' family and therefore he should act as a friend, philosopher and guide to families to enable them to maintain healthy life.

It is seen that a tendency has grown amongst our medical men to divert the profession from service of the humanity towards personal gain. Our profession should not be mercenary but humanitarian. Our motto should be "Service to the humanity"—one who imbibes this is considered to be a real doctor. This ideology should be taught and example should be shown to our medical students in the institution. A medical man has to play a very important role and make valuable contribution by his scientific knowledge and service in building up a welfare state and a healthy nation. His first duty should be to uphold the prestige of the profession. It pains me when adverse comments are made in the press against hospitals and staff. The doctors in hospitals are to work under difficult circumstances—I hope by concerted action of the profession and the Government these defects and difficulties will be removed.

Medical Practitioners

The economic condition of the most of the practitioners are said to be deteriorating on account of the over-crowding practitioners in urban areas and populous localities and also due to great reduction of the incidence of malaria, water-borne diseases etc. I think under these circumstances the practitioners may start Polyclinics jointly. The system of locum should be introduced by the private practitioners to their mutual benefit without having any misconception about it. They may also form into Co-operative Medical Service Ltd. concerns and deal in drug and pharmaceutical industry which will give opportunity to explore the possibility of developing Drug Industry and at the same time have a supplementary income.

About Ourselves

Lastly I like to speak a few words about ourselves. In these days of socialistic pattern of societies, all medical men and women irrespective of their position in service or private life, should come under the common banner of the I.M.A. and stand united in a common platform for the best interest of the mankind. We meet almost every year and try to tackle the important issues and problems relating to the profession and service. Our members seem to be more enthusiastic at the time of conference. This is not enough. We should all pool our knowledge, get together and make this organisation full of life so that our voice is honoured in the medical affairs and in the all round development of the country, a country of 40 crores of souls. We should endeavour to organise regular scientific meetings to discuss on interesting scientific topics which will invariably give opportunity to improve our scientific knowledge. It is disappointing to note that only about one third of the total number of the Registered Medical Practitioners has become members of the I.M.A. in our state. In Great Britain no doctor is given any appointment unless he becomes the member of the British Medical Association. We should all exert our influence to raise the number of members thereby strengthen the Association. Our object is not merely to improve our condition and get our grievances redressed—but the main object is to allay the sufferings of humanity and contribute to the building of a healthy nation. I appeal to the members to take active interests and participate in all the National Health Plan and programme under Five Year Plan. I hope our medical friends will always try to uphold the prestige of the profession by maintaining the integrity, loyalty to the nation, rendering selfless service and by their peaceful and sympathetic conduct. A word to our non-medical men, health like happiness is mainly subjective and not objective, it is not found in labelled bottles nor in a chemist's shop but in the will to live and live well. The lay man's recipe for health is good food, fresh air, sunshine, exercise, recreation temperence and last but not least, an optimistic outlook in life.

Before I conclude may I be permitted to remind you

the great teachings of the Vedanta and the Great Mahapurusas? Let us utilise our all power and do some service to strengthen our nation. What the nation wants is courage and scientific genius. No cry of "weak"—Strength is life, weakness is death. Weakness is constant strain and misery. Weakness is the one cause of sufferings. We become miserable because we are weak. We suffer because we are weak. We die because we are weak. Where there is nothing to weaken us, there is no death, nor sorrow. Strength is the medicine for world's diseases. We want great spirit, tremendous energy, boundless enthusiasm. We want infinite energy, infinite zeal, infinite courage and infinite patience—then only can great things be achieved.

The following resolutions were passed at the Conference :

1. This 10th Assam Medical Conference records its deep sense of sorrow at the sad demise of the following members of the profession.

1. Dr. H. K. Das, Gauhati; 2. Dr. B. N. Banerjee, Principal, Assam Medical College, Dibrugarh; 3. Dr. S. C. Ghosh, Silchar; 4. Dr. B. Bora, Jorhat; 5. Dr. A. K. Roy Choudhury, Calcutta; 6. Dr. G. Panja, Calcutta; 7. Dr. R. K. Patoi, Tinsukia; 8. Dr. B. K. Das Gupta, Calcutta.

The resolution was adopted with the members standing in silence for one minute in honour of the departed souls.

Copy of the resolution should be sent to the members of the bereaved families.

2. In the absence of any specific scheme on the subject of School Health and health of the pre-school child, both of which are important from the national point of view, this conference is strongly of opinion that Government be requested to provide adequate financial allotment in the 3rd Five Year Plan for this purpose and the service of the Social Organisation and the I.M.A. be fully utilised.

3. This conference is of the opinion that topmost priority in the 3rd Five Year Plan under the Health Scheme should be given to safe water supply, drainage, environmental hygiene and night soil disposal schemes in the interest of the health of the Nation particularly with reference to the control of water borne diseases in all rural and urban areas.

Further resolved that the scheme should be completed within a minimum period of 10 years and underground drainage be provided in towns having a population of fifty thousand and over.

4. As tuberculosis is still a major cause of morbidity and mortality both amongst the urban and rural population, this Conference is of considered opinion that effective measures be adopted by the State Government by extension of B.C.G. programme, provision of large number of domiciliary treatment teams and arrangement for the segregation of advanced cases and provision for surgical measures in institutions wherever needed to save the nation from the menace of this disease as national emergency measure.

5. While reiterating resolution No. 9 of the 9th Assam Medical Conference regarding adulteration of food stuff, drugs, invalid and baby food etc., this conference further suggests that the Food Act be so amended as to impose deterent punishment to persons found guilty under the Act and the complicated procedure in the process of detection and conduct of such cases be simplified.

6. This conference urges upon the Government and the Medical Council of India to place all doctors holding registrable qualifications in one schedule and in one common register in alphabetical order.

7. This conference reiterates the resolution No. 12 of the 9th Assam Medical Conference and urges upon the State Government to give immediate effect to the demand of the Association for unification of the different cadres in the Assam Health Service.

8. This conference condemns the procedure adopted by the I.T.A., Assam Branch for making a further split in the service conditions of the A.M.O.'s contrary to the requests and recommendations of the Indian Medical Association which is always trying for the unification of the Medical profession and requests the authorities concerned to have uniform service conditions and pay scales of all the A.M.O.'s in their employment.

9. This conference urges upon the authorities concerned to collect sales tax on medicines, medical and surgical appliances and invalid foods etc., at the source so as to give relief to the consumers and the dealers.

10. This conference requests the authorities of the collieries of Assam to improve the service conditions of their medical officers.

11. This conference urges upon the Government and requests them to see that senior doctors having longer period of service be posted in places having facilities of educating their children etc.

12. This conference express its greatest discontentment and disapproval of the State Government's action in giving registrations to the unqualified so called medidal practitioners giving them 3 months training in district head quarter hospitals and conducting an examination there. This has caused great consternation even in the minds of the general public. This conference, therefore, urges upon the State Government and the Assam Medical Council to revise their decision and to arrange for the training and examination of such unregistered persons in the Assam Medical College.

13. While the Local Board Dispensaries have been provincialised be it resolved that the Government be requested to take into consideration the length of service under the Local Board towards fixation of their pay and pension.

14. This conference views with regret that, while the pay scales of the employees of all the newly established institutions and departments under the Government of Assam have been revised and raised, the pay scales of the Principal, the Professors and the Assistant Professors of the Assam Medical College have been kept in abeyance for the last three and half years. This long and unjustifiable delay has created immense hardship to and consequent discontentment among the teachers.

15. This conference, therefore, urges upon the Government of Assam to take early action to revise and raise the pay scales of the above mentioned employees of the Assam Medical College without further delay and give effect to the benefit of the revision of the pay scales with effect from October 1956 as has been done in cases of all other similar institutions and departments.

15. Resolved that Government be urged to revise the pay scale of the personnel of the Assam Health Services as has already been done in the agriculture and other departments and in so doing due consideration be given to the hazardous nature of their duties and to sanction allowance as has been done by the West Bengal Government.

16. In view of paucity of paying beds in the Assam Medical college and in view of poor financial condition of many doctors be it resolved that a two bedded cottage be constructed exclusively for the doctor patients in the campus of the Medical college, Dibrugarh so that they may be comfortable in the special cottage to have immediate medical care. In order to implement this resolution, a committee be formed with the following persons to raise funds and to communicate with the Government.

1. Dr. K. L. Ghose, Convener ; 2. Dr. S. N. Sarma; 3. Prof. R. Goswami; 4. Dr. S. C. Baruah; 5. Dr. S. Syam.

17. In view of the fact that there are still many licentiate medical practitioners willing to undergo condensed, M.B.B.S. course this conference urges upon the State Government and the Gauhati University and the Medical Council of India to continue the facilities for

the condensed, M.B.B.S. Course in the Assam Medical College for a further period of 5 years.

18. This conference reiterates the demand of unification of cadres in the Medical services under the Assam State Government as expressed in the previous State Medical Conference and immediately to absorb all A.S. II who have completed 10 years of service to A.S. I cadre till the unification is complete.

19. This conference views with regret the discriminatory method of appointing the Medical Examiners under the Life Insurance Corporation of India after nationalisation of the different Insurance Companies and urges upon the L.I.C.I. and the Central Government to reinstate all the Medical Examiners who were working as such under different Insurance Companies as early as possible.

20. This conference urges upon the Government and the Gauhati University to start post graduate course in all subjects in the Assam Medical College without any further delay.

BRANCH NOTES

ASSAM STATE BRANCH—The annual State Council meeting was held on February 20-21 at Jorhat during the Assam Medical Conference. Forty members were present. Major G. S. Guha presided. The meeting condoled the death of Dr. H. K. Das (Gauhati); Dr. B. N. Banerjee, Principal, Assam Medical College, Dibrugarh; Dr. S. C. Ghosh (Silchar); Dr. B. Bora (Jorhat); Dr. A. K. Roy Choudhury (Calcutta); Dr. G. Panja (Calcutta); Dr. D. Panja (Calcutta); Dr. R. K. Patoi (Tinsukia); Dr. B. K. Das Gupta (Calcutta).

The proceedings of the last State Council and Working Committee meetings were adopted. The report of the hony. secretary for 1958-59, the report of the editor, Amar Swasthya for 1958-59, the audited accounts of the State Branch, of the Amar Swasthya for 1958-59 were adopted. The Budgets for 1959-60 were also adopted. Office-bearers for 1959-60 were elected with Dr. G. S. Das as president, Dr. S. N. Sen Gupta as vice-president, Dr. B. N. Chaudhury as hony. secretary, Dr. U. N. Baruah as joint secretary and Dr. K. C. Barooah, Dr. S. P. Nath were elected to the Central Working Committee with Dr. P. C. Duarah as alternate member. A committee was formed for All India Medical Conference at Gauhati in 1960.

An emergent meeting of the State Working Committee was held on 24.7.60. Nine doctors including 3 invitees were present. Dr. G. S. Das presided. The Committee discussed the management of *Amar Swasthya*. The resignation of Dr. C. A. Pathak, co-editor was accepted. Dr. B. D. Baruah was elected editor of *Amar Swasthya* in place of Late Dr. L. K. Baruah. Dr. H. D. Nath of Nowgong was elected as co-editor in place of Dr. C. A. Pathak. The Committee reviewed the progress of the work done by the Reception Committee, All-India Medical Conference and was satisfied with it. The Committee recorded its deep concern on the recent disturbances in Assam and expressed its sincere sympathy with the victims. It also expressed great resentment at the indiscriminate firing on the students of the Cotton College Hostel which resulted in the death of one student and serious injuries to six other innocent students and demanded punishment of the officer responsible for it. The Committee expressed great concern and resentment at the attacks on some medical men of the State. The Committee approved the expenditure of Rs. 700/- sanctioned for giving medical relief to the sufferers of Mizo Hills District. The Committee also sanctioned Rs. 150/- to give medical relief to the victims of recent disturbances.

AURANGABAD BRANCH—The annual general meeting of the branch was held on 30-10-59 and office-bearers were elected with Dr. L. P. Sinha as president, Dr. Ramlayak Singh as vice-president, Dr. A. K. Mitra as hony. secretary, Dr. P. B. Dutta Gupta as joint secretary, Dr. D. D. Prasad as representative for the State Council and Dr. A. K. Mitra as representative for Central Council.

A meeting was held on 25-11-59. Dr. H. B. Sahay read a paper on the problems of eradication of malaria and requested the members to co-operate with the anti-malaria department in collecting blood films from suspected malaria cases.

A meeting was held on 12-12-59 and a health week sub-committee was formed.

A meeting was held on 25-1-60 and a health week committee was formed with representatives from the public.

A meeting was held on 6-2-60. The programme of health week was finalised.

An extra-ordinary meeting was held on 6-3-60, Dr. P. N. Sinha delivered Refresher Course lectures on Deafness and Prevention of Blindness.

A meeting was held on 30-4-60. The difficulties faced by this branch in observing the health week due to non-co-operation of some of the departments of Government was discussed.

A meeting was held on 29-5-60. The State Branch was requested to take immediate steps to move the State Government for granting Rs. 150/- as minimum non-practising allowance to *all doctors* serving under the government or semi-government services.

A meeting was held on 26-6-60. The president and 4 vice-presidents for the State Branch were nominated.

A meeting was held on 24-7-60. Election of president and vice-presidents was conducted by ballot.

BENGAL PROVINCIAL BRANCH—A meeting of the Progressive Students' Association, Nilratan Sircar Medical College was held on 22nd July, to hand over a sum of Rs. 87·13 nP to Dr. H. K. Roy, President, I.M.A. (Bengal Branch) for the evacuees of Assam.

DR. H. K. ROY, PRESIDENT, BENGAL PROVINCIAL BRANCH, I.M.A. RECEIVING THE COLLECTION.

While handing over the collected money Sri Mrityunjoy Chatterjee, Chairman of the organisation referred that the money collected from various sections of students, inspired by the noble spirit of sincerity, service and sacrifice signify all-India sympathy for Bengalee refugees from Assam and deep resentment against barbarous act of violence.

Dr. H. K. Roy, President, I.M.A. mentioned this act of P.S.A. as very generous and urged the students in general to come forward in this noble act.

BOMBAY BRANCH—A meeting of the branch was held on 16-1-60. Dr. R. K. Menda spoke on Medical Defence. He said that every western country has got

Protection Society to look after the interests of the members of the medical profession, while there is none in India.

The branch celebrated the Republic Day on 25-1-60. Dr. Jivraj N. Mehta presided. Shri Khandelwal, a prominent industrialist was the chief guest. Dr. N. N. Kailas, Dr. R. A. Amesur, Dr. C. S. Thakar amongst others attended the function. Dr. C. L. Jhaveri referred to the Silver Jubilee celebration and appealed to all for the building fund of the branch. Dr. Jivraj N. Mehta spoke on the recent advances in medical sciences and pharmaceutical industries and stressed the co-operation of each other in reducing the cost of treatment for general masses. Prof. Dr. Gunter Stutlgen of the Academy of Medicine, Dusseldorf gave a lecture on 12-2-60 on Biochemical Evaluation of Anti-Allergic Treatment.

A condolence meeting was held on 12-2-60 to mourn the death of Dr. (Mrs.) D. J. R. Dadabhoy, Dr. Miss Kumud Mehta, Dr. G. T. Kshrisagar, Dr. H. G. Patel, Dr. C. M. Trivedi, Dr. C. J. Mehta.

A scientific meeting was arranged on 23-3-60. Dr. J. C. Patel gave a lecture on the Use and Abuse of Antibiotics.

To acquaint the general medical profession with the latest medical advances, a series of lectures was arranged. On 28-3-60 Dr. V. R. Khanolkar spoke on his discovery of complex culture for the growth of leprosy bacilli. Dr. Khanolkar also spoke on the infectivity, pathogenesis and immunity of A.F.B. On 29-3-60 and 30-3-60, there were demonstrations of cases by Dr. S. C. Desai and Dr. J. Fernandes. On 31-3-60 Dr. N. Figueredo spoke on Treatment of Leprosy and its Evaluation, Dr. P. Sen spoke on the role of the medical practitioners in the eradication of leprosy.

On 28-4-60, Dr. V. N. Bagadia spoke on Psychology of Addiction. Dr. Eddie P. Bharucha spoke on Visual Disturbances in Central Nervous Diseases on 26-5-60.

A condolence meeting was held on 29-6-60 to mourn the death of Dr. U. B. Narayan Rao, Dr. Mrs. Mehra J. Wadia, Dr. V. J. Modi. Dr. Jhaveri moved a resolution of heartfelt condolence and sympathies to the bereaved families.

On 29-6-60, Dr. R. N. Cooper gave a lecture on Milestones in Surgery. In his lecture he traced the history of surgery from the evolution of human race.

CHITRADURGA BRANCH—A farewell address was given to Dr. Nagaswar, vice-president of the branch on 8-8-60, in view of his departure to foreign studies at America.

Dr. H. S. Lakshminarayana presided. Dr. B. N. Venugopal spoke on the occasion.

COIMBATORE BRANCH—A meeting of the branch was held on 31-7-60. Sixty members were present. Dr. D. Sundareswaran presided. The election of president and vice-presidents of I.M.A., Central was held by secret ballot. Dr. M. P. Jesudasen read the proceedings of the last meeting. Dr. K. M. Rai, Director and Professor, Institute of Radiology, Government General Hospital, Madras gave a lecture on Certain Highly Curable Cancers in South India and their Treatment.

JABALPUR BRANCH—The members of the branch condoled the death of Dr. Miss B. Mallik in a meeting held on 8-7-60.

The following office-bearers have been elected for 1960-61. Dr. G. S. Wagle, president; Col. S. L. Gargye, and Dr. B. N. Chakravarty, vice-president.

JAMSHEDPUR BRANCH—A scientific meeting of the branch was held on 26-7-60. Sixty members were present. Dr. A. K. Dutt presented a case of Hypopituitarism. He discussed the various pathological aspects of hypofunctions of pituitary and other endocrine glands. The case, a middle aged man with loss of axillary and pubic hair and impotence was doing well under cortisone and androgen therapy.

The first monthly scientific meeting was held on 31-5-60. Dr. D. N. Mukherjee gave a talk on Cortisone in the Treatment of Pleurisy with Effusion.

The second meeting was held on 28-6-60. Dr. S. Banerjee discussed the management of Dysfunctional Amenorrhoea. Fifty members were present. Dr. S. Das Gupta elucidated the talk of Dr. Banerjee in a brief summary.

KALYANI BRANCH—The members of the branch in a condolence meeting held on 5-8-60, mourned the death of Dr. S. C. Bose, the eminent obstetrician and gynaecologist of Calcutta.

A general meeting was held on 15-8-60. Dr. K. Mitra, physician, Kanchrapara T. B. Hospital gave an interim report of his trial of INH in drug resistant Pulmonary Tuberculosis. Dr. S. C. Bhattacharya presided.

KARIMNAGAR BRANCH—A clinical meeting of the branch was held on 23-6-1960. Dr. Gulam Nabi, district medical officer narrated 3 cases of Abdominal Tuberculosis.

A clinical meeting was held on 24-7-60. Dr. Ahmed Hussain presided. Dr. N. F. Cockett spoke about the recent surgical treatment of deformities of the hand due to Leprosy, Miss John Colins of Mission Leprosy Hospital, Dichpatte spoke about Physiotherapy for leprosy patients. Dr. M. B. Srinivasan presented a case of Hyperpitutarism.

K. G. F. BRANCH—A clinical meeting was held on 15-7-60. Dr. B. Venugopal presided, 22 members being present. Dr. H. D. Chandrappe Gowda presented a case of Multiple Swellings Around the Major Joints of a girl aged 18 years and another case of Mass in the Right Hypochondrium. Lively discussions followed.

MADRAS CITY BRANCH—A meeting of the Executive Committee was held on 9th July, 1960 with Dr. G. Sriramulu in the Chair. Fifteen members were present Dr. D. V. Venkappa and Dr. K. C. Nambiar were present by special invitation.

At the outset Dr. Venkappa and Dr. Nambiar explained to the house the work so far done by the Sub-Committee appointed to submit a memorandum to the Honourable Minister in charge of Accommodation and Rent Control. Dr. Nambiar talked about the salient points in the memorandum submitted and finally said that we have to see other Ministers as well and get them to our view point. In this connection the letter written by Dr. A. G. Leela Krishnan was discussed and it was accepted by the Committee that as an emergent measure and in view of the fact that the same was intimated to the President and other members of the State Council at Chidambaram the action of this committee in appointing a Sub-Committee was in order.

Then Dr. A. M. Sivaraman moved that the memorandum be printed and copies be distributed to the members of the profession and the legislators and mobilise support. It was seconded by Dr. M. G. Murthy and unanimously passed. Fifteen new members were admitted.

A clinical meeting was held on 30-7-60. Dr. G. Sriramulu presided. At the out-set the members condoled the death of Dr. R. Sankaran, a very active member of the branch. The secretary was requested to send the resolution of condolence to the members of the bereaved family.

Dr. K. V. Thiruvengadam of Stanley Medical College spoke on Some Aspects of Respiratory Diseases in Practice.

MUZAFFARNAGAR BRANCH—A meeting was held on 31-7-60. Major N. Tyagi was in the chair. Besides routine work, methods to check quackery menace etc. were discussed. Dr. S. C. Tyagi of Medical College, Patiala gave a talk on Virus, its property, role in human infection, immunity and antibiotic and/or chemotherapy treatment as it stands today.

The members condoled the death of Dr. S. D. Aggarwal, the Municipal Health Officer.

NELLORE BRANCH—The monthly meeting of the branch was held on 31-7-60. Dr. J. Prakasa Rao presided. Dr. K. C. Nambiar of Madras delivered a lecture on Abdominal Pain. After the lecture a special meeting was held to nominate President and Vice-presidents of I.M.A. Central.

NILGIRI BRANCH—The monthly meeting of the branch was held on 23-7-60 with Dr. Mrs. M. C. Mathew in the chair. Nomination of a president and 3 vice-presidents, Central Office, was made. Dr. J. Viswanathan demonstrated 2 cases, one a child recovered from Tuberculous Dactylitis and another who was successfully treated for Tuberculous Meningitis. Dr. Walli Mohideen of Government Headquarters Hospital, Ootacamund spoke on the management of Tuberculosis with skiagrams of 23 patients. Dr. J. Primodt-Moller of Madanapalle T. B. Sanatorium spoke on Modern Chemotherapy in the treatment of Tuberculosis.

NIZAMABAD BRANCH—A meeting was held on 6-7-60. A hearty send-off was given to the president of the Branch Dr. D. Tulsi Das who had been transferred. Dr. Gulam Nabi was elected president in the vacancy.

Dr. Bani presided at the clinical meeting. Dr. Hamidullah Baig spoke on Amoebic Liver Abscess and its treatment. Dr. Razzack spoke on T.B., Meningitis and demonstrated cases of Macrocytic Anaemia and Koch's Lung. Dr. Gulam Nabi demonstrated cases of Ovarian Cysts with TB Abdomen; usually large Fibroid Uterus; and A Cyst with Malignancy.

PANIHATI BRANCH—A meeting was held on 31-7-60. Dr. D. N. Chatterjee of Calcutta Sishu Sadan gave a talk on Gastroenteritis in children. The Managing Director of Hindusthan Drug House Ltd. of Calcutta attended the meeting.

PORBANDAR BRANCH—A meeting was held on 12-7-60 to mourn the sad death of Dr. C. A. Martins on 5-7-60, when a resolution of condolence was adopted. Two minutes' silence was observed.

SEONI BRANCH—An extraordinary meeting was held to condole the death of D. G. Mokadam. Dr. Kundan Lal was in the Chair.

TIRUCHY BRANCH—A meeting of the branch was held on 18.6.60. Dr. G. Viswanathan was in the chair. Dr. P. M. Palani of Government General Hospital spoke on Diabetic Coma.

A meeting of the branch was held on 12-7-60. Dr. G. Viswanathan presided. Thirty one members were present. The members condoled the death of Dr. R. Venkataramiah, medical officer, Gandhi Leprosariam, Tholurpatty, while in the discharge of his duties, and condemned the way in which the patients attacked the Medical Officer.

The meeting also recorded the death of Dr. U. B. Narayana Rao, Editor of the Journal of Venereology and Dermatology and Medical Digest. Also the meeting condoled the death of Dr. R. Sankaran, of Ranga Nursing Home, Madras.

ULUBERIA BRANCH—A meeting was held on 30-7-60. Dr. K. P. Mittra presided. Seven members were present. The death of Dr. A. C. Roy a local medical man was condoled. The election of a president and three Vice-presidents for the centre was conducted.

It was resolved to arrange for the members a refresher course on tuberculosis. The branch noted "great concern at the situation in the State of Assam" and expressed the view "that it will not be desirable to hold the All-India Conference there.

Dr. K. P. Mittra gave a talk on Industrial Medicine as applied to Social Needs.

VISAKHAPATNAM BRANCH—A joint meeting of the Branch with the Academy of Medical Science was held at Clinical Lecture Hall, King George Hospital, Visakhapatnam on 25-6-60 with Dr. M. Krishnamurty in the chair. The following cases were demonstrated and discussed: Mediastinal Syndrome (due to Cystic Hygroma) by Dr. P. Kotiah; Post-Bacillary Dysenteric paralysis by Dr. N. T. Subramanyam; Ataxia by K. Kidandaramia; Purulent Meningitis and Tuberculosis Pericarditis by Dr. K. Krishnamurty.

WARANGAL BRANCH—A clinical meeting was held on 14-7-60. Dr. T. Lakshminarayana presided. Dr. M. Loenen presented two cases of Carcinoma of the Ovary. Dr. A. S. Mariamma presented a series of 25 cases of Benign Uterine Bleeding treated at V.M.K. Hospital in the past two years. Dr. Carol E. Jameson led the discussion in which Dr. S. Chacko, Harichavdandas and others participated. Dr. Thangaraj presented an unusual case of a Lump in the Abdomen.

The medical staff of the C.K.M. Hospital entertained earlier the members of the branch to tea and light refreshments.

A meeting of the branch was held on 30-7-60. Dr. J. Haricharandas of M. G. M. Hospital spoke on Surgical Aspects of Prostatic Obstruction.

FROM THE PRESS NOTE ON I.M.A. WORKING COMMITTEE MEETING HELD AT KANPUR ON 18-19 AUGUST, 1960

The Committee deplored the recent unfortunate disturbances in Assam. On a question being raised whether the ensuing All-India Medical Conference could be held at Gauhati in Assam, the Committee discussed the matter in detail and decided that the venue of the Conference which was scheduled to be held at Gauhati in December, 1960 as per decision of the Central Council of the Association, would not be changed and the Conference be held at Gauhati.

* * * *

The Committee approved of the action taken by the I.M.A. Building Committee to start construction of the Association's building at Delhi in September 1960 and appealed to the branches and office-bearers of the Association to redouble their efforts in collecting more funds so that the progress of the construction could go on smoothly.

* * * *

The votes of the members of the Association received through the branches were counted during the Working Committee meetings and the following members were declared as elected as the President and the three Vice-Presidents of the I.M.A. for the year 1960-61:

President—	Dr. R. V. Sathe (Bombay).
Vice-Presidents—	1. Dr. G. S. Wagle (Indore)
	2. Dr. H. C. Mallik (Dhanbad)
	3. Dr. K. Rangacharyulu (Hyderabad.)

INTERNSHIP AND RESIDENCY TRAINING IN HOSPITALS IN CANADA FOR I.M.A. MEMBERS

Dr. D. S. Mehra, Hony. Assistant Secretary, Indian Medical Association, has issued the following circular (No. 51/PGTA/59-60 dated 16-8-60) to Hony. Secretaries of all Local, State/Territorial Branches of the I.M.A. with copy to all Members of the Working Committee, I.M.A., for information:

Applications are invited from young doctors who are members of the Indian Medical Association, for internship and residency training in hospitals in CANADA, for the term beginning July 1, 1961. The appointments ordinarily carry a stipend, but the candidates will have to defray their own passage expenses. The facilities for training are available in the following subjects:

1. Anaesthesiology
2. Dermatology and Syphilology
3. General Surgery
4. Internal Medicine
5. Neurology
6. Obstetrics-Gynaecology
7. Ophthalmology
8. Orthopaedic Surgery
9. Otolaryngology
10. Pathology
11. Paediatrics
12. Psychiatry
13. Pulmonary Diseases
14. Radiology
15. Rotating Internships (Medicine, Surgery, Midwifery, Pathology—roughly 3 months each).

Applications should reach the State/Territorial Secretaries from the Local Branches by the 15th October, 1960.

The State/Territorial Branches are requested to select candidates in accordance with 'instructions' attached and after personal interview. The applications of the selected candidates are then to be forwarded to the IMA Central Office. The applications of candidates who are not selected, must also be forwarded to the Central Office. All these applications should reach the Central Office not later than the 31st October, 1960.

The final selection will be made by the Central Selection Committee at a suitable place sometime in November, 1960. Candidates called for final interview by the Central Selection Committee will have to bear their own travelling expenses and they will have to make their own arrangements for stay.

For residency and internship appointments in U.S. Hospitals the candidates are required to pass the American Medical Qualification Examination conducted by the Educational Council for Foreign Medical Graduates, 1710, Orrington Ave, Evanston, Ill., U.S.A. Those who have passed this examination can apply to the IMA Central Office for internship and residency training in U.S.A. hospitals under the same conditions as mentioned above for Canada. Those who wish to appear at the E.C.F.M.G. examination, can write to the IMA (Central Office) for details and application blanks.

Instructions for Selection of Candidates for Internships and Residencies Abroad

1. Only members of the Indian Medical Association who have good knowledge and appreciation of the Indian Medical Association, its principles and workings should be accepted.

2. The candidates, in the first instance, have to send their applications to their respective Local Branches.

The Local Branch will forward its recommended applications to the respective State/Territorial Branch along with an application fee of Rs. 10/- per candidate which is to be paid by him. The State/Territorial Branches will carry out a preliminary selection after interviewing the candidates. The applications of the selected candidates and all other applications are then to be forwarded to the Central Office by the prescribed date, along with the fees received in respect of all these applications, less 10 per cent of the amount which is to go to the State/Territorial Branch for expenses incurred.

3. The appointments in the American/Canadian Hospitals are for a period of one year in the first instance. Ordinarily only internship positions are offered, in the first year, to graduates of foreign universities. In some cases, though, where a candidate's experience and other merits demand, Assistant Residencies and even Residencies may be available in the first year.

4. Ordinarily, only young doctors, recently qualified and willing to stay abroad for 3-4 years, should be selected.

5. In U.S.A. and Canada, no Diplomas like D.O.M.S., D.M.R.E., M.R.C.P., F.R.C.S. etc. are conferred. As such, doctors going to U.S.A. and Canada for training in specialities will not be able to add letters after their names. There are however specialities for which doctors can get trained. After training (which usually lasts for 3-4 years) in approved hospitals, candidates can sit for Diploma Examinations of Speciality Boards. They will not be authorised to add abbreviations of these Diplomas to their names, but may display them in their rooms if they so desire. These Diplomas are highly thought of in U.S.A. and Canada as evidences for senior hospital and teaching appointments. It may, however, be possible in some cases, where the hospital is attached to a university, to work for M.S. or Ph.D. Degrees.

6. Candidates will have to defray their own cost of passage to and from the U.S.A. and Canada. In all cases, the appointments carry free board, residence, laundry, etc., in many cases there is an additional stipend which ranges from $25-00 dollars to $200-00 dollars per month. Ordinarily, $50-00 dollars are sufficient to meet average monthly expenses.

7. Candidates must understand that they will be going as individuals holding appointments in a foreign country and will be there not merely for post-graduate training as a student. They must, therefore, be prepared to shoulder the responsibilities that such appointments carry.

8. The candidates selected finally by the Central Selection Committee must deposit Rs. 500/- (Rupees five hundred only) within fifteen days of his final selection, failing which his name will be removed from the list. To facilitate early submission of applications to the Canadian/American hospitals, it would be preferable that this amount be paid either in cash or by a Demand Draft for similar amount on a Delhi bank payable to the 'Hony. General Secretary, Indian Medical Association', immediately after the announcement of selection by the Central Selection Committee. This amount will not be refundable, except in the case where the Association is unable to arrange for the appointment, but will be allocated towards cost of passage.

In as much as the Indian Medical Association and the members of the Medical Profession in India are likely to get a bad name by cancellation of the appointment and the Association also spends a lot of money on correspondence and efforts for getting the employment of the members of the Medical Profession, and the

damages are not capable of ascertainment in monetary figures, the sum of Rs. 500/- will be forfeited to the Indian Medical Association, if the selected candidate does not accept the post offered or his appointment is cancelled for any reason whatsoever.

All deposits must be sent by a draft on a Delhi Bank payable to the 'Hony. General Secretary, Indian Medical Association'.

9. Passages will be arranged by the Association and selected candidates must be willing to accept arrangements made by the Association for travel by Sea, or Air. Every attempt will be made to secure the cheapest possible passages.

10. Applications from candidates in services will only be considered if the application is supported by written proof from the authorities concerned that there will be no difficulty about leave of absence and release, whenever the appointment is likely to mature.

11. State/Territorial and Local Branches must take the responsibility of making sure that candidates selected by them, have necessary funds (about Rs. 10,000/-) at their disposal, and that there will be no difficulty about health certificates, passports and visas, and about their departure, *even at short notice.*

12. Only those used to Western methods of living and willing to have usual Western type of food, need apply.

13. Candidates must possess good command of spoken and written English.

14. *Typed* applications should be submitted in quadruplicate to the local branches as per proforma enclosed (Proforma 'A'). *No other comments should be made on the applications, as those will be sent in original to the hospitals concerned. Only three copies should be sent to the Central Office.*

15. Local and State/Territorial Branches should get the Agreement Forms (Proforma 'B') and Questionnaires (Proforma 'C') signed by all the candidates *on two separate sheets.* Unless these are completed, applications will not be considered by the Central Selection Committee.

16. Three copies of passport-size photograph of the candidates, with name in *block letters* on the back, should be attached with the application.

17. No candidate will be permitted to apply directly to any United States or Canadian hospital for Residency or Internship training after submitting his application to the local branch of the Indian Medical Association.

18. The candidates before applying must deposit with their respective local branches, two years' subscription in advance, so that if selected and sent abroad, their membership may continue. The candidates are required to obtain a certificate to this effect and submit it along with their applications.

The branches will forward to the Central Office this two years' C.F.C. in advance on behalf of these candidates.

19 The condidates selected by hospitals in U.S.A./Canada and whose appointments finally mature, will have to pay a sum of Rs. 100/- (one hundred only) to the Central Office of the Indian Medical Association on account of the expenses incurred in securing their appointments. This amount will be deducted out of the Rupees Five Hundred deposited with the Association as per clause 8 above and the balance of Rupees four hundred will be adjusted towards travelling expenses.

20. Ordinarily, the hospitals in U.S.A. and Canada do not provide married accommodation for their Residency staff. Married candidates are, therefore, advised not to contemplate taking their wives/husbands with them. Some of the hospitals have actually in the past, refused appointments to candidates who were keen on taking their wives with them.

PROFORMA 'A'

(Application for Residency/Internship post in Canada)

Subject :—

(1) Name in full
(In block letters)

(2) Address

(3) Date of Birth (4) Sex

(5) Married/Single
(If married, state if your wife/husband will travel with you to Canada and live with you there during residency)

(6) Member of the Indian Medical Association
(i) Name of Branch Under the jurisdiction of State/Territorial Branch.
(ii) Date of joining the I.M.A.

(7) Qualifications (Give year in which the qualification was obtained and the names of posts held with dates)
(i) Academic
(ii) Experience
(iii) Other qualifications

(8) Copies of testimonials (not more than three, to be attached to each application—one of which must be from the Dean or Principal of the Medical College).

(9) Names and addresses of two references.
(1)
(2)

(10) Three copies of passport-size photograph (with name and address in block letters on the reverse side) to be attached with the application.

Date and place. Signature of candidate.

PROFORMA 'B'

(The following declaration should be made on a separate sheet and not on the back of Proforma 'A')

"I have read and understood the rules and instructions and confirm to have agreed to abide by them. The decision of the Central Selection Committee will be final and binding.

If selected, Rupees Five Hundred will be deposited by me within a fortnight. If offered a post and I do not accept the same, the deposit money will stand forfeited to the Association."

Dated : Signature of Candidate

Name

Address

PROFORMA 'C'

(Questionnaire to be completed by Candidates concerned on a separate sheet of paper)

(a) Have you deposited two years' subscription of the Indian Medical Association in advance as mentioned in Clause 18 of 'Instructions'? Please state date of deposit and the Branch where deposited.

(b) Please state if you have previously applied for Residency Training through the Indian Medical Association. If so, please give the following details :

Yes / No

If 'Yes', please give :—
(i) Year of application.
(ii) Speciality in which applied.
(iii) Rejected or approved by the Central Selection Committee.

(c) Please state if you have applied or intend to apply directly for a Residency Post in any hospital in U.S.A./Canada. If so, please give details.

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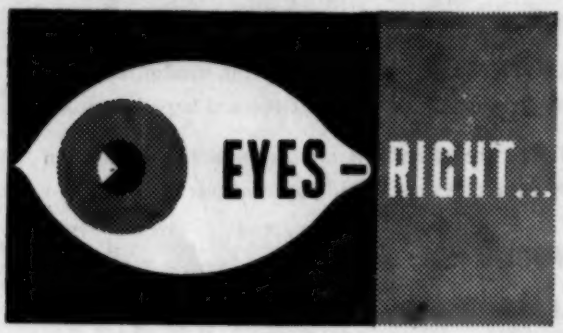

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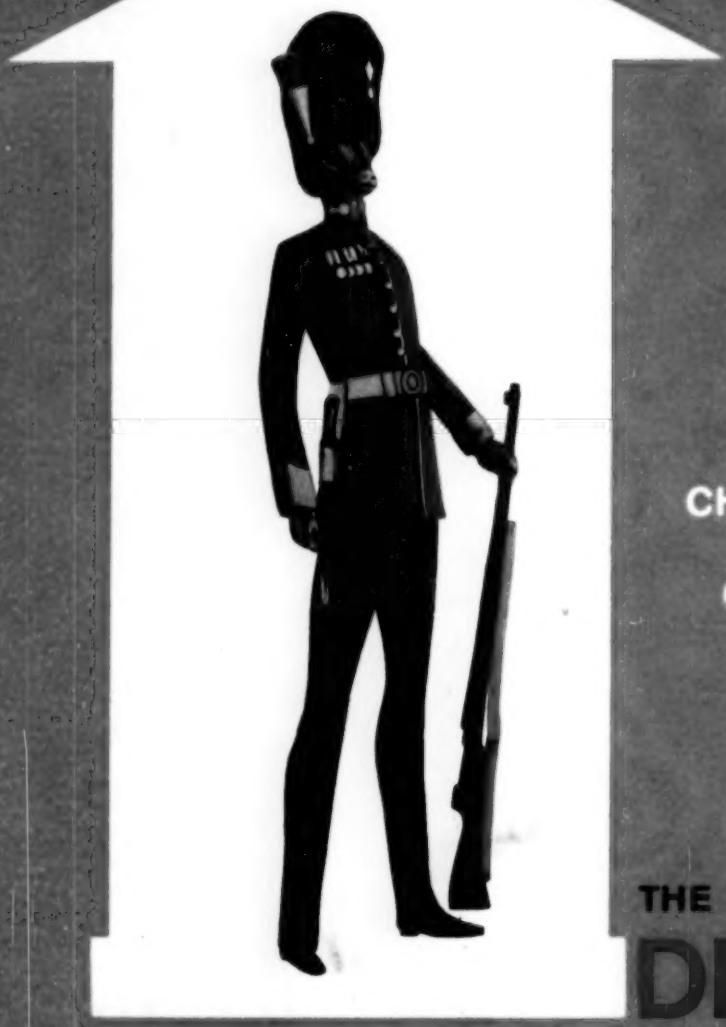

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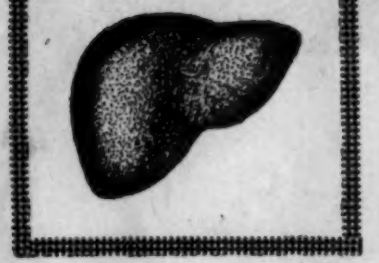

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(1) Shaffer, Thomas E.—Nelson's Text-book of Pediatrics—Sixth Edn. Dec. 1954—p. 131-32
(2) Hansen, Arild E.—Nelson's Text-book of Pediatrics—Sixth Edn. Dec. 1954—p. 80
(3) Menon P.S., Tulpule P.G. and Patwardhan V.N.—Indian J. Med. Res. (1950) *38;* 173
(4) Deuel H.J.
(5) Nhavi N.G. and Patwardhan V.N.—Indian J. Med. Res. (1946) *34;* 49

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2. *Lemere, F.: Northwest Med, 54 : 1098, (Oct.) 1955.*

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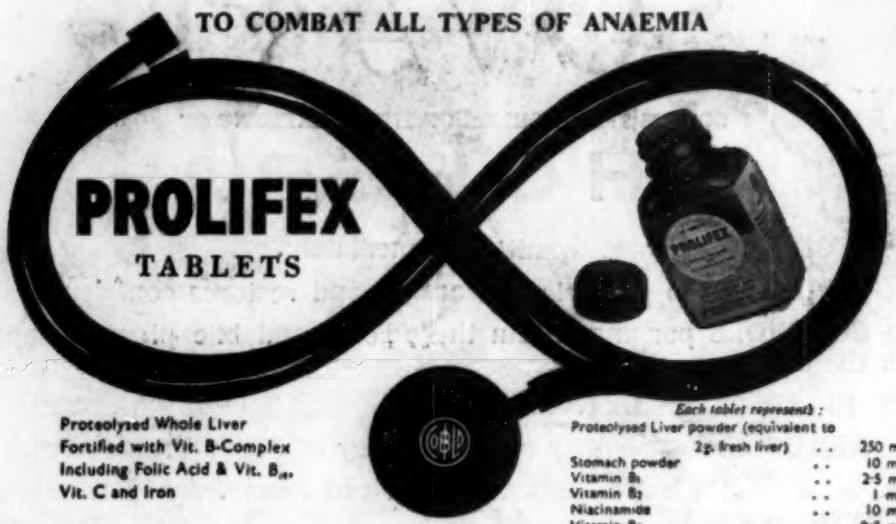

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